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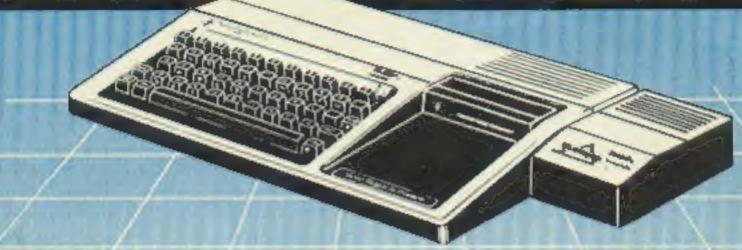
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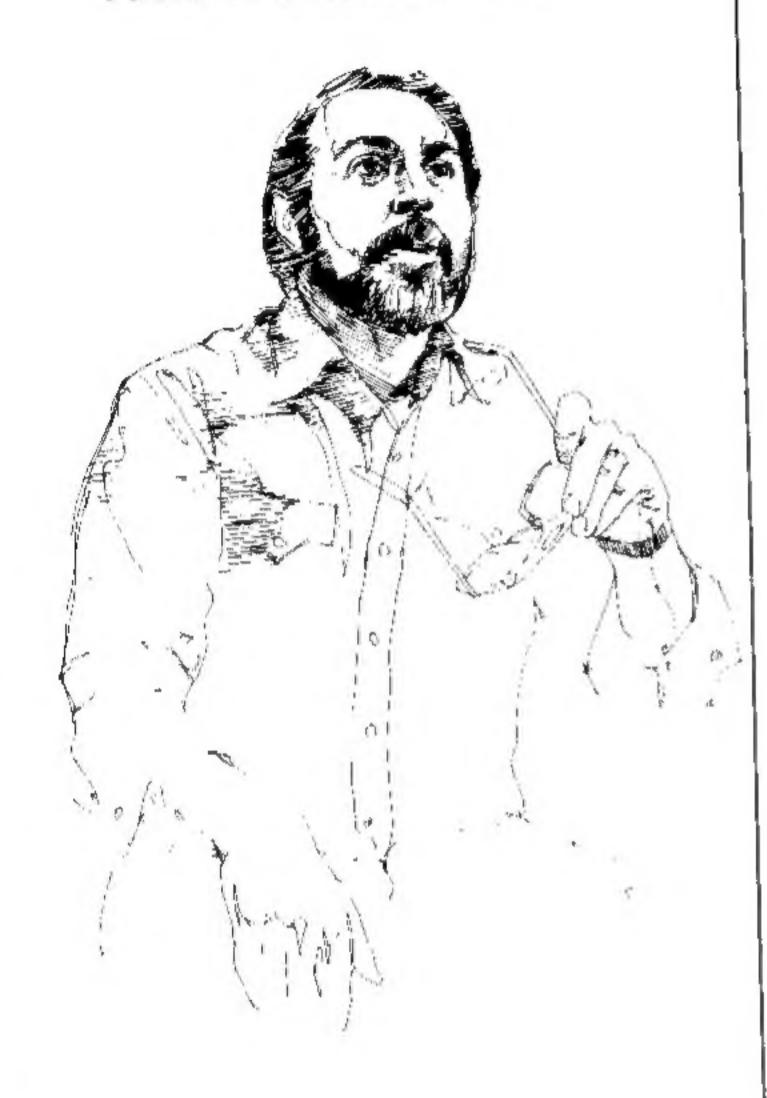
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Ultracomp Systems

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# ONSCREN

By Gary M. Kaplan Publisher & Editor-in-Chief



"Rapid growth can sometimes be a disaster in disguise."

"The price of convenience is conformity."

—Walter Hego

his month's issue is our largest to date. Editorial and advertising content have been increasing steadily in equal proportions to give you that "fatter" magazine I promised a while back. I want to thank you, our readers, for making this possible; your response to our advertisers and your help in getting new subscribers and magazine sellers has been invaluable in bringing us this far. We still have a long way to go before you can heft a monthly 300-page issue, but that isn't as remote as some might think.

As we mature as a communications vehicle, we feel we should strive for more lofty goals in two crucial areas: customer service and innovation. Rapid growth can sometimes be a disaster in disguise—on the surface it struts proudly, exhibiting its impressive new suit of clothes; but underneath this superficial costume nothing has really improved . . .

Fortunately, our editorial, production, advertising, and circulation/fulfill-ment staffs take great pride in what they do, and they constantly strive to improve their individual levels of efficiency and creativity. You readers benefit from this in at least two ways: (1) Faster in-house production of the magazine now allows shipment from a more central geographic location—a change that will ensure earlier delivery for subscribers and magazine sellers alike; (2) More innovative features will keep 99'er HCM from falling into that rut of boring, institutionalized conformity that so many computer publications have plodded into for the sake of convenience.

I also hope that you, our readers, will keep us on our toes. Whenever we do something well—or not so well—please tell us. Send us your ideas for new features and for improvements to existing ones. And by all means, keep your manuscripts and programs coming. We'll need more and more material as we continue to grow.

And we'll need new kinds of material. We're going to start featuring, for instance, works of "technological fiction." I've purposely avoided the more familiar term, "science fiction," because we've been conditioned to accept preconceived limitations in the scope of this genre. We're presently searching for unique short stories of high literary merit that are centered around computers, robotics, and associated technology.

And you accomplished programmers will want to get a head start on preparing your submissions for next month's announcement of our spectacular Home Computer Animation Contest. At this point, suffice it to say that we'll be looking for visually-attractive, non-repetitive sequences of a few minutes' duration. Animated scenes should demonstrate some random branching ingenuity to drive the projection loop.

To the "shutter bugs" among you, we'll be making cash awards for the best color photos demonstrating the educational use of the Texas Instruments Home Computer in the classroom. And if some "snap happy" members of users groups should happen to send photos of interesting (or unusual) group activities to spice up our "Group Grapevine" feature, we'll promise not to let any negative thoughts flash into our minds, frame our objectivity, filter out your creativity, or crop the best expression of your photographic masterpiece. With any luck, it might even see the light of print . . .

La fair



Hayder Amir's portruit of the TI-99/4A Home Computer may present a surprising image to those who thought that entertainment, education, and home management were the only paths along which this bold little console dared to tread. The travel stickers, which represent the 99/4A's most recent journeys through the World of Work, are evidence of what creative programming can do to transform a baid-back homebody into a decisive executive. The only problem now may be: How are we going to keep this management down on the homestead after it's seen Wall Street?"

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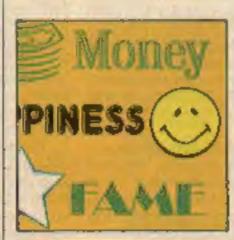
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# HOME COMPUTER

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isten J.B., a Tl-99/4A is a home computer and it's place is in the home!"

Ah, not so, Mr. Senior VicePresident! Lately this cybernetic little scamp
has been seen frequenting the work place.
Oh yes, it's true! The hustle-bustle world of profit and loss, now has to sit up and take notice of the humble Home Computer and appreciate all it can do to spruce up the world of work.

Sprucing up your dress-for-success look may be just a matter of a quick *Bit One*, *Purl Two* according to our article from the Fashion Factory. Their BASIC program for a custom-tailored skirt will allow you to slip into something a bit more comfortable and stylish too.

Is your firm skirting the issues of production and profit because of the high cost of charting your progress? Worry no more—Graphic Persuasion is here to represent your state of affairs with stunning bar graphs. This BASIC program will help you make low-cost, colorful visual aids to impress the powers that be.

A rare meeting of powerful electronic brains is the subject of *An Ensemble of Assemblers* in which we examine three assemblers to see what they can do and how they run.

Running out of cash can happen in the best of businesses, but by using *Cashflow* and its Extended BASIC program, you can find out where your money goes and how to get the river of riches flowing in your direction again.

Does your office go with the flow, set trends, or leave well enough alone? In Public Investigator you'll discover how you can create a questionnaire to query your customers. This BASIC program will even compile, evaluate and print out the results for you. Talk about an ideal tally system!

While we're examining ideal forms, let's consult with the philosopher who taught us all about such things in our new feature, *PLATO's Progress*. Now that Control Data has made their learning library of educational software available to Home Computer owners, we will be communicating every new and exciting moment as it happens. This time we see how PLATO helps parents and children join forces for peak learning experiences.

Let's peek at what can happen when your computer is too big or too small for your business in *Mean Machines and Small Potatoes*. The moral of these two anecdotes will keep us from taking ourselves too seriously.

features. Go ahead then, tuck your August issue into the secret compartment of your briefcase. Armed with these articles and programs plus the fresh applications you'll come up with, you and your trusty 99/4A can take the business world by storm. And

Our Multiplan Medium is still taking her work seriously. In this issue, our sage Explores Rectangles and speaks to us of ways to use rectangular groups of cells to expand Multiplan's usefulness.

Our LOGO turtle is more useful than ever too. In *Turtle Text*, the LOGO language becomes a versatile word processor and learns some new tricks including how to print a document that is really a procedure in disguise.

Things are not exactly what they seem in Pocket Sunrise either... they're better! The good Professor Holl brings us enough sunshine in his BASIC program to make Noah wish he'd taken a TI-99/4A with him on the ark.

Now that the sun is up, we'd like to awaken you to the possibility of using the Hex-bus as a communications link between the CC-40 and the TI-99/4A. In Hello, Little Brother, the Hex-bus helps these two machines send messages back and forth.

You can send your message in any language—or alphabet—with a compact new printer. See how it stacks up in our review. Peripheral Vision 99.

A business with the latest in printers needs the convenience of word processing. Our review of *Typwriter Keystrokes for Thrifty Folks*—tells about a low-cost word processor that won't spell disaster to your profit margin.

Marginal though some of your past attempts may have been, when you play our BASIC game, Success Formula, you will discover that you can pursue a career to make yourself rich, famous and happy before you're 41!

Of course, real life doesn't come with guaranteed second chances, so if you are looking for something that even a preschooler can count on, you won't be able to resist *Counting Fun*. A certain extrater-restrial joins up with his favorite playmates and toys for learning fun in this BASIC math game.

Toying around with snakes, fires, cannibals and acid pits may not be your idea of fun until you play our Extended BASIC game, Jungle Jim. If you believe in the old saying, "It's a jungle out there!", this game could be a good training ground for learning to survive any corporate chaos you may encounter.

"Corporation" and "business" need not, however, be synonymous with "confusion" and "bungles", as you will see after reading this months' special articles and regular features. Go ahead then, tuck your August issue into the secret compartment of your briefcase. Armed with these articles and programs plus the fresh applications you'll come up with, you and your trusty 99/4A can take the business world by storm. And when your co-workers ask, "What's a nice little Home Computer like that doing in a work place like this?" You'll know just what to say.

Until next month, have fun reading, learning and RUNing!

Typesetting

Julienne Laabs

June Gaber

# LETTERS TO THE EDITOR

Dear Sir:

recently purchased Microsoft's excellent Multiplan and have found it to exceed all expectations. There is, however, a most glaring shortcoming not mentioned in your article contained in the April issue of 99'er. Many other TI owners utilize the parallel connection between console and printer. Not only is the hardware less expensive, but the transfer rate is much faster than the 9600 baud serial rate. Yet when I first tried to print my spreadsheet results. I found to my dismay that the program is written to access only serial printers. Is there a "fix" or must I be forever limited to 'Planning sans hard copy? Please help with whatever information you can find. I am sure many other readers would be interested in you answer.

Robert F. Pinion College Park, GA

You might have overlooked the directions for addressing printers on page 14 of the Multiplan User's Guide. There you'll find the specifications for setting up the program with either serial or parallel printers. When you select the Print Options and enter the "setup" field, you need only to type "PIO" for Multiplan to print using the parallel port. If you don't specify this option, the default is "RS232.BA = 300"; serial transmission at 300 band.

If your printer still will not print using this option. there is the possibility that it is cabled incorrectly. See the note on page 41 in Peripheral Vision 99 in this issue.

Dear Sir:

A company by the name of "Foundation" in Tiburon, CA advertises a 128K Memory Card for the 99/4A Peripheral Expansion System Box in 99'er HCM.

Is this an acceptable product which functions as well as the TI-32K Memory Card but with a greater memory or are there serious problems and limitations?

Karlyn Shedlowski Stroudsburg, PA

We are in the process of reviewing several memory expansion devices, and we'll print our findings in an upcoming issue.

Memory devices larger than TI's 32K memory expansion card will have to consist of multiple "banks" or "pages" of memory. These pages will have to be switched in and out rapidly to simulate a larger memory area. Even with a 128K board in place, the 99/4A will only "see" its first 32K of RAM because of the way it is memory-mapped. With the console's BASIC or the Extended BASIC cartridge, you'll only be able to address 32K of expansion memory. The only effective way to utilize the larger memory devices is through Assembly Language routines. either from the board's manufacturer, from another software house or of your own devising.

Dear Sir:

I've finally stopped playing and programming long enough to write. I have lots of questions, but a couple that have me stumped are (1) why won't the Speech Synthesizer say "WIN", "WAS", "NICE", "INCORRECT". "TEXAS INSTRUMENTS" "READY", "-', and "+"? Using the Extended BASIC module I've tried these words as both "wordstrings" and "direct-strings." The words just get "spelled out" as letters. I had to replace "WIN" with "WHEN" in a game program.

Also (2) I can not get a return for diagonals using the joysticks. The corners are "dead." SAMPLE

100 CALL CLEAR :: CALL SPRITE(#1,42,2,95,130) 110 CALL JOYST(1,X,Y) 120 DISPLAY AT(24.1):X;Y 130 CALL MOTION(#1, -Y.X) 140 GOTO 100

You can never get "-4.4", "4.4", "-4.-4" or "4, -4" displayed. One return is always "0".

I'm sure the majority of your readers have only the console and a cassette recorder and, maybe, Extended BASIC. A few articles on LOGO or P-Code are fine but mostly give us more BASIC articles. expecially don't like the Portable Computing section. I don't know anyone who owns a CC-40 and haven't seen one in the stores. How many of your readers use the CC-40 and why does the fact it's battery operated entitle it to a separate section? Its version of BASIC must be similar enough that a quick check of the owner's manual would answer the user's questions about differences from the 99/4A's BASIC.

Robert W. Hali Godfrey, IL

Your Speech Synthesizer won't say some of the words in your list, Bob, because it is limited to the resident vocabulary. The words you list which are parts of phrases in the resident vocabulary-WIN

in YOU WIN, for instance—are only accessible in that phrase. And in order to have the Speech Synthesizer say the phrase completely rather than spell it out, the whole phrase must be enclosed in pound signs (#) as in the following statement:

CALL SAY("#YOU WIN#")

The TI Extended BASIC manual has a list of these words and phrases on pages 203 through 205. In the case of the numeric symbols (+ and -), it will only say these words when they immediately precede. a number.

As far as your joystick difficulties go, our resident gamester says that they may be due to the joysticks which you're using. Some-including TI's joysticks—are not very sensitive at the diagonals, and only intermittently return the values for the diagonals at precisely the right positions. There are brands of joysticks on the market, however, which will consistently return the diagonals.

We feel that the CC-40 merits more extensive treatment not because it is battery-powered, but because it is one of the first of the new generation of miniature computers with very broad capabilities. Besides the Compact Computer itself, a broad range of peripheral devices are being developed at Texas Instruments for this system. These include a Hexbus interface for the 99/4A, a Wafertape drive, an RS232 interface, a modem and a 4-color printer/ plotter. When complete, it will form a very versatile system. You might look at the article on the CC-40 in this issue for an insight into some of the potential.

Dear Sir:

I am interested in Compact Computers, have a Radio Shack PC4 and Texas Instruments CC-40.

I'd be interested to read about any information you can pass along.

I read about it in the April 1983 issue of the 99'er Magazine but there didn't seem to be a subscription card, hence the note: Is there such a thing as the Portable Computer Magazine?

> Howard J. Cassidy Jr. Cucamonga, CA

We'll be glad to pass along more information about the Compact Computer system as it becomes available. For now. Portable Computing Magazine(tm) exists solely as an insert of 99'er HCM.

Continued on p. 68

#### Entering 99'er Programs

New readers should be aware that within the magazine's pages are found actual computer programs that you can put into your Home Computer and enjoy.

Make sure you have any special system components required by the program (e.g., the Speech Synthesizer, Extended BASIC cartridge, etc.). Then, using the console keyboard, you can type the printed

magazine listing (character for character, and line by line) into the computer's memory.

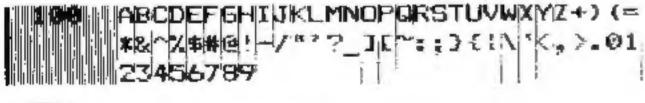
Before entering the program, connect a cassette recorder to the computer. Make sure you have two blank cassette tapes. For each 10-20 lines you type in, use SAVE CS1 to save that program segment onto one of the tapes. Alternate between the two tapes each time you save the program. Be sure to rewind to the beginning of each

tape before saving, so that you always record over and replace the shorter segment of program lines with the longer segment. By following this procedure, you'll always retain most of your work even If the lights go out or someone turns off the computer.

Double check your typing against the program listing for errors, and then have someone else check it. The most common errors are typing the letter "O" instead of the number "0" (zero)—they are *not* interchangeable to the computer. This is also true for the letters "I" and "L" and number "1" (one). See "Key-In Reference"

Every time you make a correction to your program, SAVE CS1 and switch the tapes. Once all the errors are corrected, you will have a good copy of the program on the last tape. Before turning off the computer, put the other cassette tape in your recorder and once again SAVE CS1. Now, if one tape gets damaged, you won't have to enter the program listing via the keyboard all over again. Have fun and h py computing.

#### **Programming Conventions KEY-IN REFERENCE**

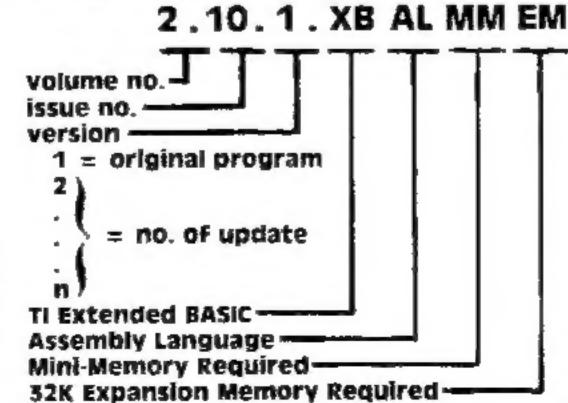


=End of Program or Article

compu-prestidigitation

(kóm pū pres teh di jeh tā shūn) —n. I. The magical quality of unexpected comprehension that results from presenting technical information about computers in a lively, entertaining, visually attractive and easy-to-understand format. 2. The magical tricks that make a computer sing. dance, and do all sorts of wonderfully useful things.

#### 99'ER VERSION



# 99/FORAY INTO BUSINESS

# BIT ONE PURL TWO

### PROGRAMMING PATTERNS FOR A PERFECT FIT

By Pat Olsen

1911 Rucker Everett, WA 98201

ardware, software, and knowearthey may seem like strange bedfellows But combining the TI 99/4A with a marketable idea has produced many such unusual collaborations. Nowhere is this more evident than at The Fashion Factory In Everett, Washington, where one of the brightest new fashion ideas has come from the creative efforts of fashion designer Billie Buell and programmer analyst Marty Keil-and, of course, the TI-99/4A With each contribuling technical information from her own field, the two businesswomen have developed a highly salable home computer knitting program. Hand or machine knitters need only enter their measurements and a knitting gauge, and the program produces a pattern to fit any size from 6 months through size 36.

Fashion designer Buell first entered the machine knitting market "Years ago when I had six kids at home, and couldn't knit fast enough with two needles to keep

them all in sweaters and hats." Little did she know that there would be a day when she would be able to produce the patterns for six perfectly fitted sweaters, half a dozen hats, and maybe a coal or two in the same time it used to take her to run down to the store for a ball of yarn.

Buell has spent many years practicing the art of producing the perfect fit in clothing. She has taken the basic design shapes and grouped them in a logical way to come up with formulas that will work for all figure types.

The need for an accurate program arose when Buell opened her knitting-machine shop last year. In addition to knitting custom orders for her clientele, Balbe had to chart patterns for them. Each pattern took at least an hour—often longer—to chart, and this left her little time for her other business duties.

When a person is



pressed for time, and there are phones ringing, people to help, and customers talking to you, it's hard to be sure that the pattern you have just charted will actually fit," says Buell. "Charting takes plenty of concentration and a liberal dose of peace and quiet to be positive that you will be able to knit a garment that fits."

That's where microcomputers are put to good advantage," says Marty Keil. "Machines never become upset when people are looking over their shoulders while they are printing out patterns. Once we perfect the basic calculations, we know that our patterns will fit perfectly."

When Keil met up with Bueil, she had just formed her own company to help small businesses take advantage of microcomputers. Bueil already had a pretty good idea that the key to making up an easy home computer program to chart patterns lay in translating her ideas into BASIC language. "Billie had a good idea of what her TI-99/4A might be able to do." says Keil, "but no way to actually produce the program. We spent several days just exchanging information so that we each could begin to understand exactly how our respective machines would work."

Computer Meets Knitter

Although Keil had never seen a knitting machine and had no conception of how to design an accurate fashion pattern, she was able to work well with Buell's knowledge and ideas, turning them into programs that could be easily understood by any home knitter. Both agreed that the TI-99/4A was the best computer to use because of its ease of operation and ability to adapt applications for reprogramming into other home computers.

According to Buell, the body's contours coincide with geometrical configurations. "There are only so many different geometrical shapes that can be combined for a figure. These shapes can be defined in terms of parallelograms, rectangles, triangles, angles of any given degree, and curves which can join any of these angles." After the basic shapes that go into the design have been defined, the process that remains is one Buell compares to a child balancing building blocks. A shape builds upon the one that went before it. and all are connected with the soft lines which we call the "figure." In the process of designing a garment any of these shapes can be interchanged to establish the basic look of the end piece. For instance, a dolman-shaped sleeve would require a different set of geometric shapes than a simple fitted shell

Buell's fabric is a machine knit, supple and adaptable to the human shape. To determine how many stitches or rows will

Continued on p. 11

## GRAPHIC PERSUASION

### Visual Aids to Make Your Point.

By Fred Ellis

P.O. Box 777 Edioburg, TX 78519

umbers are abstractions that are sometimes hard to grasp; to understand and compare them quickly, it's often worthwhile to turn them into concrete representations—bar graphs, for instance. The program accompanying this article does exactly that: It turns abstract numbers into multicolored bar graphs. The program can easily be customized for different applications. Figures 1 and 2 are examples of graphs plotted by this program.

Properties of a Good Graph

The objective in making a graph is to communicate, and there are some definite and specific elements a good graph should contain. These include accurate scaling, clear numbering, and adequate labeling.

If the graph is to be projected from a 35mm slide, a good rule-of-thumb is that the slide should be readable when held at arm's length. It slides are made by

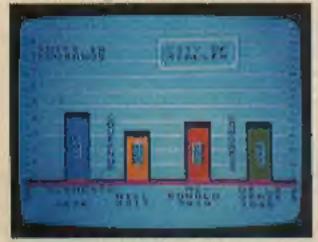


Figure 1. A graph plotted with the program Bargrapher. Burs were spaced to leave lots of room for labels.

photographing the CRT screen, this rule is met automatically by the size of the 99/4A's resident font. Another requirement is that the graph's axes be labeled, and the labeling should give the following information: (1) the name of what is represented, (2) numerical values, and (3) units.

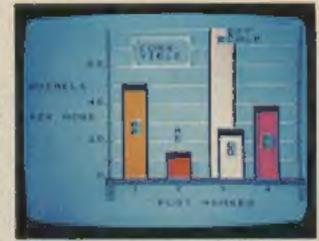


Figure 2. For this display flargrapher was customized to put the vertical axis on column 10. Also shown is the response of the program to an off-scale datum.

Scaling the axes is a compromise. The taller the bars, the easier it is to read the graph, but you must leave enough space to accommodate the largest values in the data set. A good value to start with for this program can be found from the formula:

where MAXVAL is maximum value in the data set rounded up to the nearest multiple of 2, 5 10, or power-of-ten. For scaling and numbering, I recommend that multiples of 3 be avoided. In fact, I try to use consecutive integers multiples of 2, multiples of 5, multiples of 10, or powers-of-ten.

Tick marks should be harmonious. For example, if the height of one screen character represents 10 units, making tick marks by lurning on every other row of pixels creates tick marks that increment by 2%. Such markings are hard for the viewer to work with. How does one visually subdivide using 2%? In this case the best you can do with an 8-pixel-high screen character is to turn on the first and fifth rows to create increments of tive. Actually, you may not even want tick marks that close together.

Each bar or bar group should be identined. It may be desirable to add associated numerical information such as percents. Last but not least, every graph should have a title. Graphs should be designed to please students, not protessors: readers, not authors: viewers, not attists.

How to Use the Program

When using the Bargrapher program, you will find that you can change and reposition all the labels. In particular, the title with its box, can be placed anywhere on the screen. You can also change the color, position and number of bars (up to four), and incorporate various axis-labeling and tick-marking schemes into the program.

There are also two automatic features in the program. One of these is off-scale protection. If a datum is high enough to result in a bar whose top would be off-scale, the bar will be plotted "folded." The off-scale part will be plotted up from the baseline, and displaced to the right from the full-scale bar stem. The graph in Figure 2 includes an off-scale bar. A second automatic feature is the positioning of the percent label above the bar for short bars, which can be seen in Figure 2.

The program statements most likely to be changed are between lines 280 and 780. This part of the program is set oil



Figure 3. The three parts of a har involved in the outlining routine. With this example, three pixel rows will be turned on in the bar cap, and in the bar head the top four pixel rows will be black.

by the barbed wire (-----) in lines 270 and 780. Non-cosmetic changes must be made within the later sequential parts of the program. Table I shows how to make various changes in the program.

Continued on

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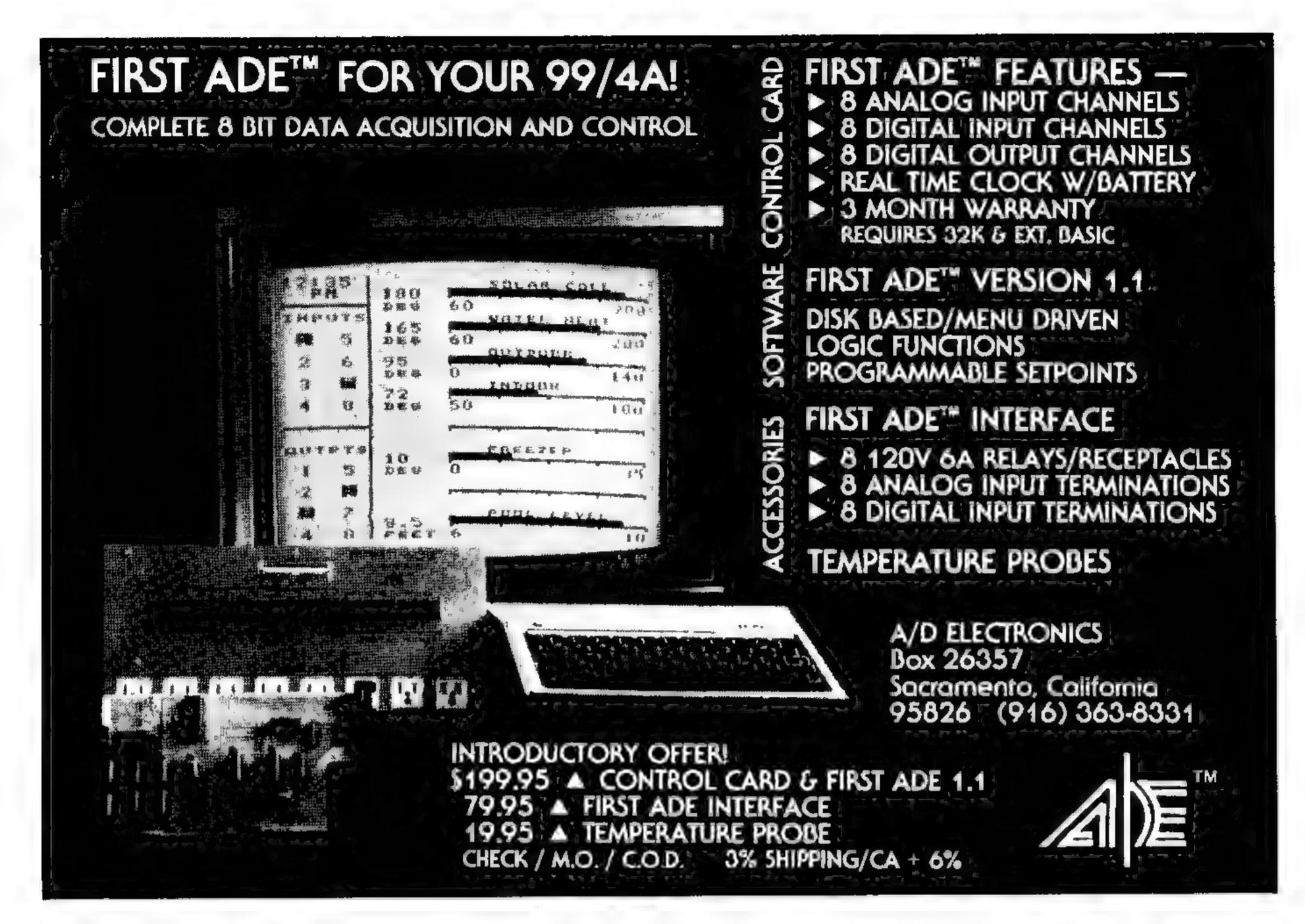
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#### Purl Two . . . from p. 8

be used for each shape, the yarn is knitted to form a piece of fabric which is called a *swatch*. This swatch is measured to find the number of stitches or rows in one inch, and the results of this are called a *gauge*. Final calculations are found by multiplying body measurements by the stitch or row gauge. The resulting calculations are then multiplied to give the correct number of stitches to cast on for a given garment, as well as the number of rows to knit before increasing or decreasing the angle for the various types of shapings.

Although the process is a fairly simple one, it has taken years of study to understand how the pieces must fit together to form the whole. Buell felt that there were not many home knitters who would care to take the same time to research and understand body design. But Marty Keil was challenged by Buell's idea of using the TL99/4A home computer and BASIC to shape garments. Keil was accomplished in the use of a mini-computer and COBOL. and happily sne found that the TI 99/4A was a simple computer to work with. Given the precision of the geometric figures and the ease of the computer, the programs practically began to write tnemselves.

"One of the reasons that the programs were so easy to understand is that when a garment is knit, it begins at the bottom nemline and builds itself into some sort of geometric shape," says Keil, "It was a fairly simple matter to take the formulas, which

were already in Billie's brain, and computerize them."

Also, according to Keil, the precise and mathematical art of charting lent itself perfectly to the flow-charting process. Keil emphatically stated that this is the most important part of the program and will provide the structure that is necessary to writing an easy program design.

"The formulas were intriguing," Keil said, "because all of the rectangles, triangles and parallelograms worked together to give a perfect fit to the human body. Small areas here and there added just enough fullness to produce a fit that wasn't precisely the molding of the form."

Keil went on to explain that the program uses so many subroutines because all garments use the same formulas, no matter what the shape. Once these subroutines were developed, one program could write the next with very little variation.

"It was a real learning process for me," said Keil. "Working with BASIC, learning terms used by machine knitters, and maintaining flexibility to allow the user to still be able to design within the program framework was a real challenge."

**Pattern Enterprise** 

Although all of the programs Keil has designed were written on the TI 99/4A, they can be and are being rewritten to work with any other home computer. That way a home knitter not familiar with the shapes needed to understand charting will

have no problem feeding in either a cartridge or a disk to the home computer. The work and expertise are already there. The knitter merely adds in the correct measurements plus the gauges taken from a sample swatch of knit fabric. Within the minutes it takes to process the input figures, the computer produces a complete and perfect-fitting personal pattern that will knit easily into a custom-made garment. Buell and Keil have produced a series of programs that cut the time of charting from hours to minutes and are, above all, accurate.

More and more knitters have begun to take advantage of knitting programs which they can take home and use whenever they are ready to knit. Customers like the fact that they can by-pass years of training in both charting and computer programming and use programs to customize their own fashions. When Buell and Keil became aware that their programs could be adapted to other computers and marketed anywhere in the country, they began advertising in national knitting magazines. They now fall orders all over the United States.

For knitters who don't own or have access to a computer, Bue Land Ke's also started a computer pattern cab. Knitters can pay for a membership on a yearly basis and obtain the same patterns for a nominal fee by just sending in their measurements and knitting gauge. The pattern service has begun to bourish as

Continued on p c



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#### Persuasion . . . from p. 9

Other changes would require considerable programming—for instance, trying to have more than four bars of different colors. As it stands now, the program—uses—all—of—the—user-defined character sets. (I just wish there were more character sets available.) Also, if the bars are to be individually labeled, four bars are about the most you can fit on the screen without running out of space for labels

Description of the Program

to to positions on the screen, there is a rather long subroutine near the beginning of the program, starting at lines 290 and ending at 650. Statements for data, par color, and vertical axis markings are next and bring us to line 790.

Most of the special screen characters used in the program are defined with data statements and a CALL CHAR loop. These data statements are at lines 790 and 840, and the defining loop uses the fo lowing lines up to line 890. If you try to define these characters by typing in individual CALL CHAR statements, you are going to get an acute attack of ennui. Al the color sets are defined next. The statements that actually do most of the mechanics of drawing the grid lines, tick marks, etc., and labeling the graph are lines 1000 to 1260. At this point in the program the screen is ready for the bars.

The interesting part of the program is: the loop which plots the bars. There are two special functions of this loop. First, the loop dynamically plots bar heights to one-pixel resolution. The characters used at the top of each bar are defined during program execution by the code between lines 1370 and 1800 using the Jong strings in lines 1280, 1290, and 1300. Hexadecimal strings which define the bar-top characters are taken from these strings using SEG\$ statements, with position determined by the data. For instance, such selection and definitions are made by lines 1390, 1400, 1560, 1570, and 1580. (the article, Dynamic Manipulation of Screen Character Graphics in 99'er HCM, Vol. 1, No.6, described this technique.)

The second special function of the loop is to put black outlines around the bars. Without the outline the edges of the bars appear smeared, fuzzy, and blurred.

Following the bar-drawing loop, the vertical axis is labeled, and the title and its box are added. Note that the title box will "paint over" anything else on the screen; thus you will have to move it it it covers up the top of a bar. Next, lines 2370 and 2380 hold the display on the screen using the CALL KEY subprogram. After the END statement there are subroutines for printing vertical and horizontal labels. The last subroutine draws the bar stems. In the case of an off-scale bar, program execution will

pass through this rout ne twice, the second time to draw the off-scale part of the bar.

Rather than data statements the program could use files or arrays. Thus lines 190, 1350, 1360, and 2390 are reserved for possible use with tiles on cassette or floppy disk.

Outlining

As mentioned earlier, a plack out ine is used around the bars so their edges will not appear blurred. Part of this blurring can be blamed on the computer. and its CR1 monitor; I assume that this is due to such things as the CRT screen matrix, bandwidth, circuit ringing, overshoot, stray coupling, etc. Be that as it may, the blurring is real, although the effects are not equal in a Loirections; The horizontal smearing is worse than the vertical, and it smears to the right. The situation is worse with red. Light red especially will bleed far into colors to the right. But there is very little smearing. with black, probably because black is achieved in a CRT by completely shutting off the electron beam.

But the other part of the trouble is in front of the CRT. The human eye does not do a good job when certain co or pairs lie next to one another. For example, a red area adjacent to a yellow area will appear fuzzy even with good monitor resolution. Drawing a narrow black line between these areas will make

the boundary appear sharp.

Continued on p. 55



# An Ensemble of Assemblers

The Land Language Series

# A Comparison of Three Mini Memory-Compatible Assemblers

By Patricia Swift
Technical Editor

A ssembly languages are traditionally highly symbolic, with minemonic operation codes representing fairly simple instructions. An assembler is a program that changes Assembly Language statements into the machine code which can be executed directly by the computer. No matter what kind of assembler you use, you need a place to put the machine code it generates. This machine code must be in RAM (random access memory) that is directly addressable by the microprocessor if the computer is to run it. There is only a small amount of this addressable RAM in the console itself. The Mini Memory Command Cartridge contains 4K of RAM, and the expansion memory gives you another 32K. For users without expansion memory, the Mini Memory is the least expensive way to add enough RAM to do some sign ficant Assembly Language programming.

All three of the assemblers reviewed in this article use the Mini Memory. (They also build machine code in the expansion memory if you have it.) While disk drives and printers may be supported. I used only one cassette recorder in com-

paring the packages

Texas Instruments' Line-by-Line Assembler comes with the Mini Memory at no additional cost. The MAX Assembler from M.K. Eckhaus is available for \$25. The Dow Assembler by John T. Dow costs \$25. All three are shipped on cassette tape, et you use Assembly Language based on 9900 Assembly Language, and all three can build machine code in the Mini Memory's RAM. But the similarities end there. In other ways, the three could hardly be more different.

The documentation for all three of these assemblers was adequate. Since none of them describes the assembler statements in detail, a lithree wisely recommend that you also purchase It's Edator/Assembler manuals. Novices should be aware that none of these manuals, not even the Editor/Assembler manual, teaches you how to program in Assembly Language; they cover the mechanics of the languages, not

now to think in assembler

How They Work

These assemblers take in Assembly Language statements from the keyboard and put machine code into the Mini Memory. In order to do this the assembler must keep track of any symbolic names and labels you use. This is done in a symbol table where labels and their addresses are kept. Once the assembler has finished its work by creating a machine code module, the assembler and its symbol table are no longer needed in RAM. You can use FASY BUG (which comes with the Mini Memory) to save the machine code from the Mini Memory to cassette tape no matter which assembler you use.

It's not enough to merely put the machine code into the Mini Memory somewhere. The program name should be

placed in the REF/DEF table so it can be referenced later. This table starts at >7FFF and grows toward >7000; its size is determined by the number of entry points you need. The two-byte address at >701E, called the Last Free Address in Mini-Memory (or LFAM for short) tells the system where the top of the REF/DEF table is. If an entry is added to the REF/DEF table, the EFAM must usually be adjusted to reflect this.

The Mini Memory contains RAM addresses > 7000 through > 7FFF. The first part of this memory (addresses > 7000 through > 7117) is reserved for system use. Assuming a minimum of one entry in the REF/DFF table to define your program's entry point, you are left with Mini Memory locations > 7118 through > 7FF7, or 3808 bytes available for your use. The three assemblers vary greatly in how many of those 3808 bytes can be used for the finished machine code

program.

The machine-code modules created by all of these assemblers can be moved using the Mini Memory Relocator program (published in the May, 1983 issue of 99'er HCM). This relocator allows you to overcome some of the size restrictons of these assemblers. After splitting the program into two or more logical chunks, you process each module through the assembler and save it with FASY BUG. Then use the Mini Memory Relocator to relocate the modules from wherever they were loaded originally to other locations in the Mini Memory. This technique allows you to construct programs which use all 3808 bytes in the Mini Memory, but you can see that it is not the most convenient process.

As your Assembly Language proticiency increases, the question of how large your programs can be will become important. To give you an idea of the sizes you'll be working with, the simple sprites programs which appeared in the April, 1983 issue of 99'er HCM occupied about 260 bytes of

machine code.

If your Assembly Language programs run perfectly the first time and never need to be changed, then the question of what happens to your source program will never come up. In real life, things are never that simple. You can be sure that you will need to change your program at some point. The three assemblers cope with this need in different ways, as noted in each section.

Another important consideration is speed—now long does it take you to arrive at debugged machine code? In s is the most important question of all. The answer will vary for different individuals. If you compose your source program at the keyboard, then a momentary hesitation between entries of source lines will probably not slow you down at all. If you carefully write out your programs first, then you will want the entry into the computer to be as fast as possible. Program ming style and proficiency are also factors. Do you program in smallish modules and test them singly, or do you enter

the whole program at once? Is most of your time spent debugging rather than composing the program initially? Do you already know 9900 Assembly Language? If you do, be careful not to make hasty assumptions, because each version of Assembly Language closely resembles 9900 Assembly Language. This similarity can also be confusing if you're using TI's Editor/Assembler Manual.

Line-by-Line Assembler Texas Instruments Consumer Relations P.O. Box 53 Lubbock, TX 79408

Cassette, \$99.95 (includes Mini Memory cartridge)

TI's assembler is an *instant assembler*. This means that each source statement is translated into machine code and stored in the Mini Memory as soon as you enter it. You can actually see the code which is generated, and the translation is extremely fast. If you refer to a label which has not yet been defined, the assembler generates a reference (you see an R). When you (hopefully) define the label later, the assembler fills in the address(es) right before your eyes. All this action may be confusing at first, but it will quickly become an education in machine code as well as a valuable self-checking device. You can display the symbol table at any time to see what labels have and have not been defined. As soon as you finish entering your program, the machine code will be in Mini Memory ready to be executed. You must put the program's entry point into the REF/DEF table and adjust the LFAM. pointer explicity; this can be done via the Line-by-Line Assembler.

The form in which you enter each statement is very simple. If the statement has a label (two characters maximum) you enter it, and follow with a space. If the statement has no label, you just type a space first. Next comes the op code fo lowed by a space, and the operands, separated by a comma. The ENTER key signals that the statement is finished. If the statement has a syntax error, the assembler tells you right away. You are not obliged to spend time lining up your

The Assembly Language supported by the Line-by-Line Assembler is very close to 9900 Assembly Language. The instruction RT is not implemented (use B \*R11 instead), and only seven assembler directives can be used: AORG, BSS, DATA, END, EQU, SYM, and TEXT, Comments are not allowed, and labels may be only two characters long. Otherwise, the Line-by-Line Assembler's statements are just like those described in the Editor/Assembler manual. Figure 1A snows a portion of the sprites program as it would be entered into the Line-by-Line Assembler.

TI's assembler resides in the Mini Memory itself, and so does the symbol table. This increases its speed, but it also greatly reduces the space available for your program. For all intents and purposes, the Line-by-Line Assembler uses address >7118 through >7CD7. The symbol table starts at >7CD8 and grows toward >7FFF. (Its actual size depends) on the number of labels you use in your program.) The default starting point for your machine code program is > 7D00, which leaves you room for nine labels. To use the Line-by-Line Assembler, you should have its two entry points (OLD) and NEW) in the REF/DEF table, as well as one for the program you're building. This means that addresses > 7FE8 through > 7FFF are occupied by the REF/DEF table. Therefore you have 744 bytes for your machine code program (>7D00 through > 7FE7) in this environment. If you use no symbolic names at all, you can start your program at >7CEO and thus squeeze in 776 bytes of machine code, but it's hard not to use any symbols or labels. If you want to use more than nine labels, then you must start your program at a higher address. than > 7D00 (easily done via the AORG directive), but this shortens the room available for your program.

The sample program Lines which comes with the Mini Memory illustrates an important point about program size. When you first load the cassette tape into the Mini Memory, both the Line-by-Line Assembler and Lines are present in Mini Memory. The program logic and initialized data areas for



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Lines all fit between > 7D00 and > 7FE7. After you run the program Lines, the Line-by-Line Assembler is no longer present. This is because *Lines* uses some workspace between address >7118 and >7D00, thus obliterating portions of the assembler. This illustrates two points: 1) The assembler does not need to be present during the execution of the program. it created, and 2) you can effectively use other areas of RAM. for workspace at RUNtime, as long as you don't need to initialize the workspace beforehand. This way you can use the Line-by-Line Assembler to create programs which are really much larger than 744 bytes.

While you are using the Line-by-Line Assembler, it maintains a small screen buffer. You can scroll up and down to view the last nine screens if you want to check your work. But if you want to change a previous statement, you may have problems. Different Assembly Language statements generate: different lengths of machine code. If you want to replace an SRL statement with a JGT statement, that's easy because both are the same size. You can scroll the screen up to find the address of the SRL statement, type an AORG command to get to the right spot in memory, and then type in the new JGT statement there. The assembler will generate the code for the JGT right over the old SRL. Then AORG yourself back. to where you were before and continue entering the program. But if you want to replace the SRL statement with a longer MOVB instruction, you usually have to go back to the SRL statement and re-enter the program from there on down, starting with the new MOVB statement. If you catch your mistake right away, this isn't much work.

Aside from the screen buffer, the Line by Line Assembler keeps no copy of your source program. Longer programs will exceed the screen buffer, so towards the end of your program you will not be able to go back and view the begin ning. If you happen to have a printer and/or disk drive, the Line-by Line Assembler cannot use them. This means that you should keep a handwritten copy of your entire source program, at least until it is completely debugged.

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The MAX Assembler M.K. Eckhaus P.O. Box 1079 Elgin, IL 60120 Cassette, \$25.00

The MAX Assembler by M. K. Eckhaus uses a completely different approach. The MAX Assembler is actually a group. of BASIC programs which run in the 16K of console memory. Only the output of the MAX Assembler (the machine code)

is put in the Mini Memory. The MAX Assembler consists of three BASIC programs and one data file. To use it, you first load the program ASM1 from

tape using BASIC's OLD command. The first statement number in ASM1 is 4000, which leaves room at the front for you to add your Assembly Language source statements, You add your source statements using BASIC's editor. When they look just right, you RUN the program ASM1 to check the syntax. ASM1 reads the op code file which comes with the MAX Assembler and outputs an intermediate work tape. If ASM1 finds syntax errors, they are shown after it has finished parsing your whole program. If you have errors, you can edit your source program with BASIC's editor and run ASM1 again until it finds no errors. At this point you can SAVE ASM1 to a different tape with your source statements for later use. Next you load the program ASM2 from tape, again using BASIC's OLD command, When you RUN ASM2, the program will ask you to mount your work tape from A5M1; it uses this to build machine code in the Mini Memory. You will be asked to rewind this work tape once during ASM2 because it makes two passes. If you have a printer and want an assembler listing of your program, you must tell ASM2 about this and then RUN ASM3 afterwards, again using a (different) intermediate work tape for output from ASM2 and input to ASM3. If ASM2 finds any errors, it writes them to a work tape for viewing by ASM3.

The syntax of the source statements for this assembler varies significantly from 9900 Assembly Language. Since the source

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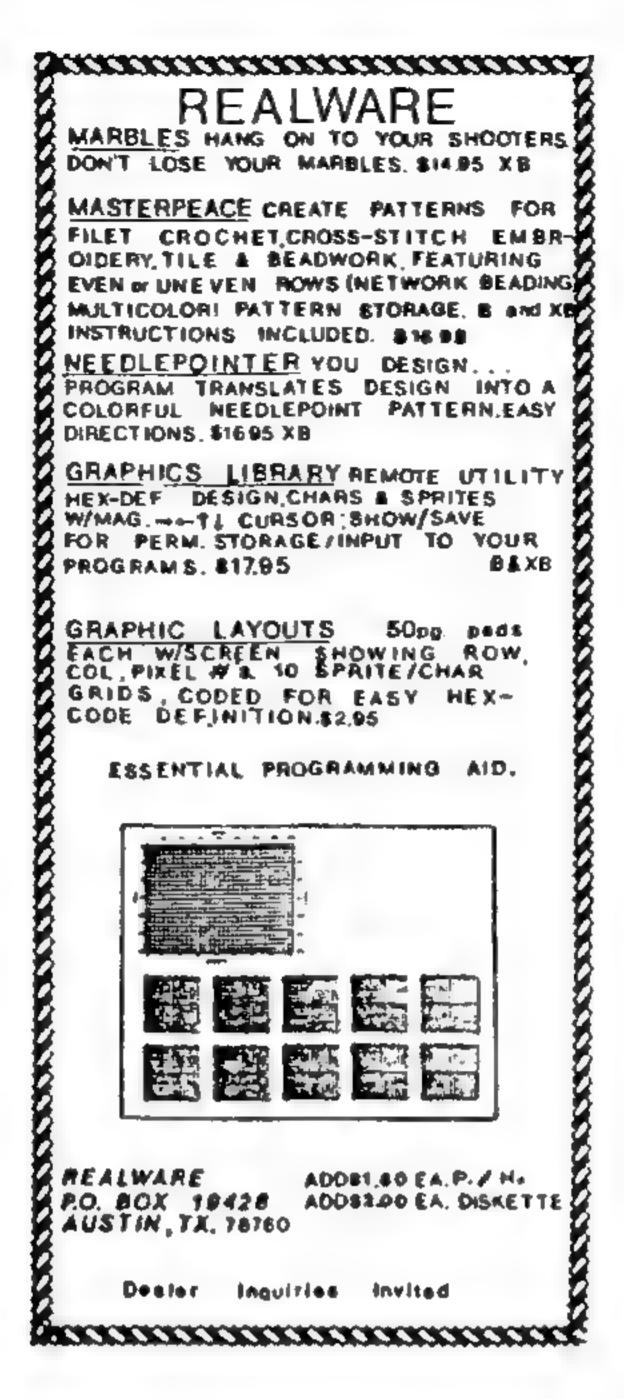
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statements are part of the BASIC program ASM1, each statement must have a sequence number lower than 4000. Then you must have the word DATA with spaces both before and after it, because the statement will be input to ASM1 via a BASIC READ statement. After this comes the label (up to 6) characters), if any, followed by a space; you can use up to 108 such labels. If the statement has no label, you must enter # and a space. Next comes the op code. All 9900 op codes are supported, as are the assembler directives AORG, EQU, BSS, BES, BYTE, DATA, TEXT, DEF, REF, EVEN, and END. After this you put the operands, separated by periods. It may ne hard for old programmers to remember to use periods, but commas are not allowed because they are meaningful to BASIC's READ command. The MAX Assembler has its own format for operands which, in the manual's words, "differs somewhat from TI operand syntax." At least superficially, the main difference seems to be that labels are preceded by the @ symbol. You must also precede all register operands with R (optional in 9900 Assembly Language). Finally, your statement may contain a comment preceded by at least one space. Figure 1B shows a portion of the MAX Assembler source statements for the sprite program. This assembler also has the names of the VDP utility commands built in, so you can just refer to such things as VMBW (VDP Multiple Byte Write). without naving to define them.

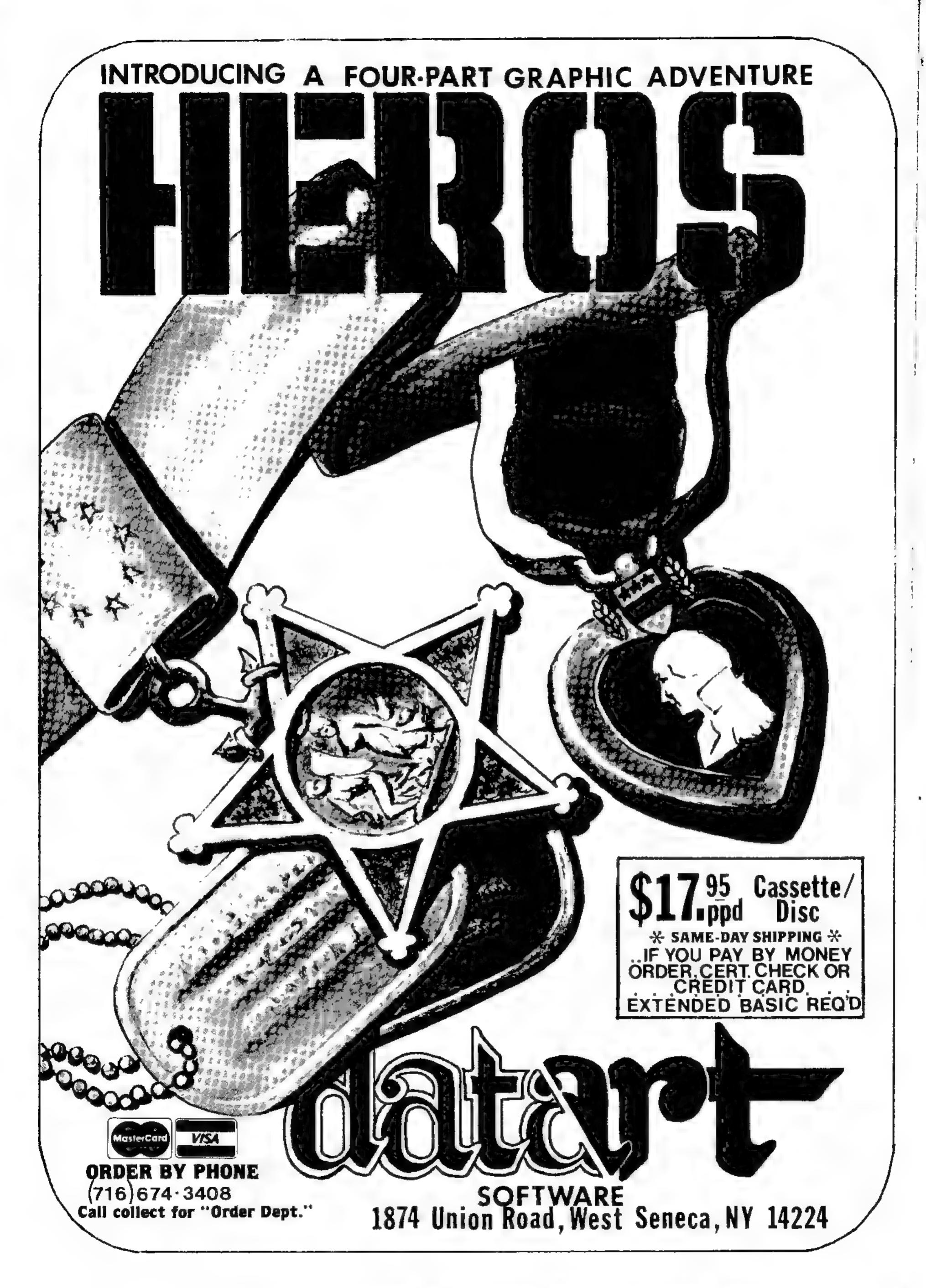
The actual entry of the source statements is fairly fast, and the BASIC editor allows easy updating and scrolling throughout the source program. The MAX assembler is not interactive, so you don't see syntax errors right away; ASM1 lists up to 49 errors on the screen at the end. The statement numbers of the error messages can be cryptic—they refer to the actual sequence number of the statement in the source program, not to the BASIC number of the statement. The author suggests that you-use BASIC line numbers starting with 10 and going up by 10, and use RES 10 after adding any source statements in between. This works fine; all you have to do is append a 0 to the line number in the error message

to get the BASIC statement number.

Since the MAX Assembler resides in console RAM, you can theoretically use all 3808 free bytes in the Mini Memory for your machine code program. However, a single source program cannot usually make such a lengthy machine program. BASIC will most likely run out of memory (MEMORY FULL message) if you try to enter that many source statements at the beginning of ASM1. The manual that comes with the MAX assembler gives a rough estimate of 130 source statements. per segment, and explains how to use the special CONT directive to hook together separately-created segments. It's hard to say what this source maximum is because it depends. entirely upon the source statements being used. If you segment your program, each segment must be processed separately through ASM1 and ASM2 (and ASM3, if you want an assembler listing). You can have the MAX Assembler hook them together via the CONT directive, or you can make use of the REF and DEF commands which cause entries to be made in the Mini Memory's REF/DEF table. In this way, separate subroutines could be defined in one segment and called from another. The MAX Assembler's AORG allows you to locate the subroutines in different sections of the Mini-Memory, but it's up to you to be sure they don't overlap, You can also use the DEF command to put the entry point of your program into the REF/DEF table for execution later. (When I used the DEF directive, I found that the MAX Assembler made a pefect REF/DEF table entry but did not adjust the LFAM properly; I did the latter with EASY BUG.)

When it's time to change your program, you load the latest version of ASM1 with the program from tape. Make the changes with the BASIC editor, RESequence the program to start with statement 10, and run ASM1 again. You will also have to run at least ASM2 to reload the program into Mini Memory.

If you have a disk controller attached, you will have to turn if off to run ASM2. If you have a second cassette, you can Continued on p. 28



By Joel S. Moskowitz, J. D.

2410 El Pavo Way Rancho Cordova, CA 95670.

hat usually wrecks our family's monthly budget is not some unexpected emergency or a sudden desire to fly to the Bahamas for lunch. We are driven to the poorhouse by expenses which regularly show up a few times. each year: Car insurance payments which are due in March, June, September and December but leave us alone the other eight months; property taxes due in December and four months. later in April; a life insurance premium payable in June; a vacation we are planning to take next August; college tuition due: n September. We see these expenses coming. We are like the captain of a ship who sees an iceberg heading right toward the ship, but who never plans an evasive maneuver.

When several of these expenses cluster in one month, we are scramb ing for money to live on the day after payday. In months when these bills leave us alone, we are "rich." We suffer from a financial disease known as "cash flow" problem. The solution to this monetary manic-depression is to level out the peaks: and valleys by paying one amount each month that anticipates,

saves up for and pays these bills.

This is where the power of your TL 99/4A and the speed of random access files come to your rescue. To run this Extended Basic program, you will need a Disk Controller Card (or peripheral) and one disk drive. Although the program could be modified to utilize sequential files from a cassette or DATA 🔏 statements within it, the program would run *much* more slowly.

When you RUN the program, the menu will ask whether you want to: 1) set up new accounts, 2) display. the accounts, 3) change the accounts, or 4) end the program. As this is your first time using Cashtlow, you will press 1 to set up new

accounts.



In this subroutine, you will be prompted to supply information about your expenses. First, you will be asked the name of the item. Any name or names, up to 14 spaces, is acceptable. Next, you will be asked how many times per year a payment is due on this item. If, for example, the item is fire insurance, and you receive an annual bill each July, you will enter 1. If you are on a payment planwhich allows you to pay for your insurance in four

installments, you will enter 4.

For each of the payments you indicate, you will be asked to supply two facts: the month the payment is due, and how much is due in that month. If money is due for fire insurance in July, we will input 7 (as July is the 7th month) and the amount of the bill. You will then be asked if you want to save an equal amount each month toward that item. If you do, then the required calculations will be made automatically, and you can go on to the next item.

This feature can be a real timesaver if you have multiple payments of unequal amounts over unegual intervals. One family I know sends a daughter to a private school. They must pay \$300 in June, \$1,200 in September and \$1,500 in February. The program automatically spreads out each payment over the year, and then for each month calculates how much should be saved

toward these payments.

However, you might not want the payments to be equal. One neighbor wants to save \$2,000 each year to put in an Individual Retirement Account (IRA) each December. But his budget is too. tight to allow equal monthly payments of \$167. After August, however, Social Security stops withholding \$300 from each month's paycheck, and he has money left over. He therefore decided to save \$300 toward his IRA each month from September to December, and to spread the restof the money he needs to save over the entire year. As a result, he saved \$67 a month toward

his IRA from January to August and \$367 a month for the remaining four months. This gave him an extra \$100 a month spending money for eight months of

the year.

If you want to devise such a custom plan, indicate that you do not want the level payments option. The program will then display the months of the year in sequence and ask how much you wish to have saved toward that bill by each month. In our

example, \$67 will be available for the IRA in January. When another \$67 is added in February, the total amount accumulated will be \$134. Note: that you should enter the total amount accumulated for this item. over the months to date (\$134), and not just the current month's payment,

While this custom option is useful if you have periodic surges. in income which you want to level out, for the most part we should let our TI do the work and opt for leve payments.

When you finish entering the data for the first item, the process will start again with the second item. When you have runout of items, just press [ENTER]. You will then be asked the number of the current month and how much you have already. saved toward your expenses as of this month.

After you have entered this data, the computer signals that it is working as it totals the figures and prints them to your disk. in a file it has set up named "CASHDATA." You will note that it takes quite a while to print this data, as opposed to the very rapid access you will have when you use it. This allocation of time will be discussed in the programming tips later.

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THE 99/4A PROGRAM EXCHANGE P.O. BOX 3242, TORRANCE, CA 90510 If you have made a mistake entering any items, don't worry. The data will be very easy to alter later. But before we consider how to change the data we have entered, we will look at how we use it in the Display subroutine.

**Display Accounts** 

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When you select this subroutine from the menu, the left's de of your screen displays a list of all the expense items you have entered. You are then asked to input the number of the month you wish to examine (or to input 0 if you want to return to the menu). To see your situation in January, for example, enter 1. The name of the month will appear at the top of the screen. Next to each item, you will see the total amount you want to nave set aside as of January to pay bills on that item. If any bill is actually payable in January, the amount of the expected bill will be displayed on the right side of the screen as a negative number in parentheses. The amount will be paid out of the total saved.

At the bottom of the screen your situation is summarized. First, the total amount you are supposed to have accumulated for all items is displayed. If you have not saved anything toward your expenses in prior months and if no bills are payable out of this total in January, this is the amount you would have to pay into

your account to stay on track.

Usually, however, you will have saved something toward this total as of the end of the previous month. The amount of these savings is displayed next. Under that, the total amount of all expenses due in January is set forth. On the last line 's the amount of the payment which you have to make in January to get ready for the next month.

For example, suppose the bottom four lines of the screen look like this:

TOTAL 2500 - SAVINGS 1800 - EXPENSES 400 PAYMENT 300

This tells you that the total amount you need to have accumulated before paying any expenses is \$2500. You have been saving toward this amount over the previous months, however, and after your last payment you have accumulated \$1800. Moreover, \$400 in bills due this month will be taken out of this total. The actions you will take this month are to 1) pay the \$400 in expenses and 2) pay \$300 into the savings account toward next month's needs. Between your expenses and your payment to savings, your total outlay is \$700, which represents your "level payment."

Occasionally, the PAYMENT figure is a negative number, as in the following example:

TOTAL 2500 - SAVINGS 1800 - EXPENSES 900 PAYMENT -200

In this case, the two actions you will take are to 1) pay the \$900 in bills as itemized and 2) withdraw \$200 from your say ngs to help you pay the bills. Again, your net "level payment" is \$700.

Changing the Accounts

There are various reasons why you might want to alter your accounts: Your auto insurance rates just went up; your child just graduated from college, and you no longer have to save for his tuition; you have decided to go to Europe next August, and you need to save \$3000 for the trip. Whatever the change, when you select Change Accounts from the menu, you will see your expense items as well as PRESENT MONTH/SAVINGS displayed on the screen. The needed data will then be read from the disk.

You will have the options to 1) alter items, 2) enter new items 3) delete items or 4) indicate that your changes are completed,

Deleting an item is easy. Just select this option and enter the number of the item you want to delete. It you indicate that you want to add items, the program will take you back to the prompts you originally used to input your data. If the screen indicates FILES FILLED you will be able to add new items on yit you first delete items to make room and then print this shorter list to the disk.

If you indicate that you want to alter an item, the screen will display all of the data pertaining to that item, including its name the month and the amount of each payment, and the amount accumulated towards these payments for each month. You can alter any of these items. Unless you merely want to change the name of the item or are altering a "custom" account, the easiest

way to alter an item is to delete it from the list and add it again as a new item

When you's gral that your changes are completed, the new totals will be computed and the new data will be printed to the disk, ready to display

#### **Practical Pointers**

While Cashtlow will make your financial life much more tranquil, it is a whole new orientation to paying your bills, and you should ease into it slowly if you want it to work. The most practical method, and the one which I used, is to ease into Cashtlow over the period of a year, Each month, after a bill is paid, add it to your program so that you can begin to save for its reappearance the following year. If too many payments are due in the same month to make this practical, add only some of the Items to your list and save the rest for next year.

One other major benefit of Cashtlow should not escape your notice. You will be earning interest on all that money you set aside. The actual amount in your account will therefore be greater than the required savings displayed in the program. While the program could easily have taken account of this interest to reduce your payments a bit, the purpose of ignoring interest is to give you a margin of safety when some of the bills are higher than you expected. If inflation and taxes don't gobble up your surplus, then throw a party to reward yourself for your discipline, or reward your TI-99/4A with some new software.

If, nowever, things are so tight that you cannot afford a margin of safety, you can discount the interest in advance in favor of lower payments by using my program Savings in the April, 1983-99'er HCM. Use the "level payments" subroutine to figure out the amount of monthly payment that will, when added to your interest equal the amount of your bill at the end of a year. You can then mu tiply this figure by 12 and feed the result into the level payments option of this program.

#### **Programming Pointers**

The major advantage of random access files over sequential files is speed of input. Rather than having to read all of the data in the file, you can proceed directly to the record containing the informatin you want.

In reading data on a disk, the computer consumes more time in locating the data and relatively less time in reading it. It is as though you lived in a summer cabin and had to haul your water from a we I 50 yards away. Most of your time would be spent in transit to and from the well. If you carried two buckets, instead of one, you could haul the water you needed in a much snorter time. In setting up your files, you will want to put as much data on each record as is practical and arrange the data in the order in which you will use it.

In the file in this program, the names of all of the expense items are contained in Record 0. When you select the Display subroutine, only one record will have to be read to input all of these names, and they will therefore be rapidly displayed on the screen. If these names were located on different records, the operation of the program would be much slower.

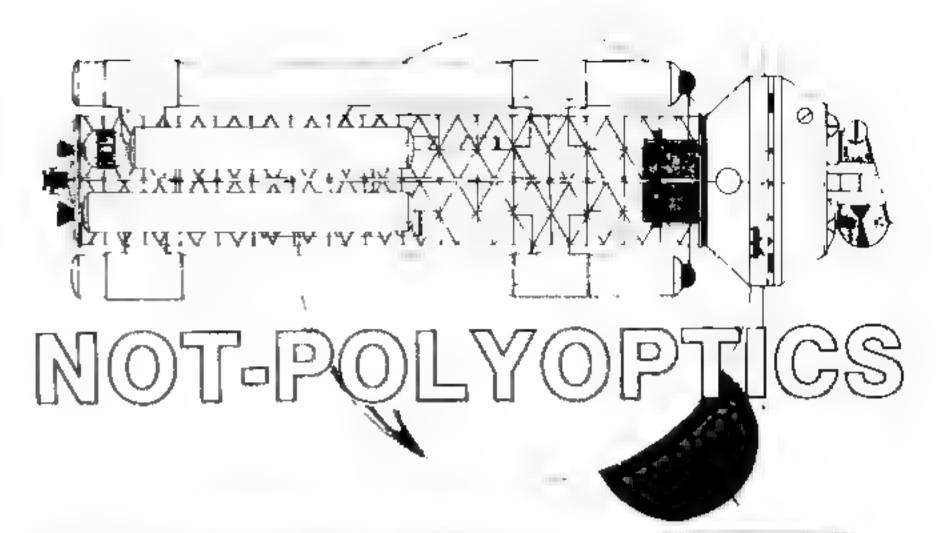
On the same principle, all of the display data pertaining to each month, with the exception of itemized expenses, are contained on the same record.

That explains why the names of the expense items are 14 letters and spaces long, rather then 15. The program utilizes a maximum of 16 items. Only 15 strings fit on a record of maximum ength if those strings are 15 letters and spaces long. But if the strings are 14 letters and spaces long, 17 of them can fit on a record. This leaves room at the beginning of the record for a notation as to how many items there are.

While speed in display requires that the data be arranged by month, speed in changing the data requires that it be arranged by item. The data is therefore arranged on the file in both ways. When you indicate that you want to alter data, not all of the file is read in, only the minimum data about the expense items. Displaying some of the data in two forms of organization in creases disk space and printing time, but you are compensated by speed of use.

Ine on y thing faster than reading records efficiently is not having to read them at all. Therefore, when you display the figures for a given month, the value of a variable (U(M)) changes from 0 to 1. If you later want to display that month again, the data will be read from the disk only if the value of U(M) is 0.

Continued on p. 26



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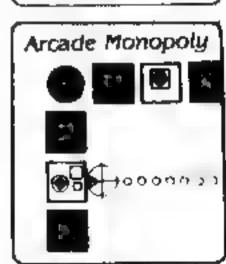
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# KEY STROKES FOR THRIFTY FOLKS-

# A Review of *Typwriter*By Walter Hego

Contributing Editor

Name: Typwriter Program Type: Word Processor Extended BASIC Language: Distributor: **Extended Software Company** 11987 Cedarcreek Drive Cincinnati, OH 45240 Price: \$32.00 cassette \$35.00 diskette **System Requirements:** Extended BASIC cassette recorder Excellent Good Documentation: **Human Engineering:** 

he price of word processing is dropping so rapidly, it's hard to keep up with it. Printers are turning up at prices that appeared impossible just a short while ago; this puts word processing hardware within reach of a good many Home Computer owners for whom it was once just a pipe dream. These people will now be looking around for inexpensive word processing software to complete their systems.

Typwriter, a software package from Extended Software, may be precisely what they're looking for. This program allows you to enter text into the computer, then save, recall, edit or print that text. It also provides a number of simple commands which can be inserted directly into the text to control the format of the final, printed product.

#### Usefulness

Usefulness:

Typwriter comes on either cassette or diskette and is written in Extended BASIC. Although the minimal system limits you to about 600 words of text input at a time (120 lines of text, each line about 5 words long), you can perform an extremely simple conversion which approximately doubles the available text buffer space if you have a memory expansion peripheral card.

Typwriter does not necessarily limit you to short, 600-word documents. Its formating commands let you form longer texts by chaining short documents together. When the command @A appears at the end of a text file followed by

another file name, *Typwriter* finds that file and prints it immediately following the file it has just printed. Thus, if you have limited memory space available, you can SAVE documents in sections.

If you need to generate repeated copies of a given document, you can use the @A command followed by a space and the letter R (@A R) to print as many repetitions of the document as necessary. The PROMPT command (@P) lets you generate "customized" boilerplate documents. If the printer will accept software control codes, the @S command can direct the printer to implement those options. Several other formating commands allow simple formating of text as it is being printed.

Entering and editing the text you want to print is straightforward—with one exception. *Typwriter's* text lines are short, and there is no warning before you hit the margin. When I was using it to write this review, I often found myself typing over characters at the end of a line. Although the manual contends that "you can get used to typing lines of about 20 characters and pressing the ENTER key without looking at the screen," that is a procedure I have yet to master. It is especially irritating when a long word, like "straightforward," falls at the end of a line. Is there room—or isn't there?

Those of you who program in BASIC will find *Typwriter*'s editing functions very familiar. Even if you're not a BASIC programmer, it shouldn't take you long to become familiar with all the commands. When you start out, however, you need to know that you can enter and exit the Edit mode only if the cursor is in or at the left margin.

#### **Documentation**

Typwriter's documentation is quite clear. It covers all the instructions and gives examples when appropriate. The instructions for changing the underlying BASIC code to take advantage of memory expansion devices should be sufficiently clear for even the most timid and computerphobic nonprogrammer. The manual, which is concise and follows the main menu screen, makes it easy to find the information you need and to relate the text to program use. The section on getting started gives novice users a guide to follow, some general hints, and the reassurance that

punching the wrong keys as they learn won't cause the computer to go up in smoke.

The manual requires some editing in places—the spelling errors are particularly disconcerting in a word processing manual. In addition, the sections on the DROP and JUSTIFICATION commands are a little mystifying. But some experimentation will make their use clear.

**Human Engineering** 

Typwriter provides easy access to all the features of the system. Most users will quickly become familiar with all twelve formating and nine editing commands and probably won't need to refer to the manual for help. At every step the menus give clear prompts to direct the user, Typwriter, in its disk-based form, takes advantage of one of the nicest features of Extended BASIC: It loads itself automatically. When the text you've entered reaches the storage capacity of your system, however, you get a cryptic error message:

# CODE = 57 JUST ENCOUNTERED AN ERROR.

The screen will direct you to the Extended BASIC manual, where you will read another puzzling message. Rather than merely giving you an error message when you hit the limit of text, the program would be much more helpful if it prevented you from entering any more text, and gave you a message that memory was full and you should now SAVE your text.

Not all users can readily take advantage of many of the program's features. Those who have cassette-based systems may be able to use some of the boilerplate features in the formating commands, but this will require careful planning, and a lot more jockeying around of cassettes.

And there are a number of things you wouldn't want to try with *Typwriter*. This program's short line length would make it very difficult to set up tables, for instance. Any word processing jobs which require heavy editing, movement of blocks of text, and extensive insertions would also best be done with other software. This is not to say you *couldn't* do it—you can shave with a Bowie knife, after all, but. . .

So if you're looking for low-cost software for a relatively small volume of word processing—software which does what it says it will—*Typwriter* may be for you.

# SOFTWARE

### FOR THE 99/4(A)

#### **MASTER DISK FILE**

A master index of your disks. MASTER DISK FILE uses a large portion of the 90K bytes available on a single sided disk as virtual memory to create and store a perpetual file of disks, programs and applicable data. Data can be added, removed or up-dated. The file may then be accessed for viewing on the screen or for printing several types of lists on a printer.

Insert disk into drive, it is catalogued then can be filed.

Reads up to 95 programs and files per disk. Maximum of 120 disks or 1100 programs may be filed.

Does not require memory expansion.

Supports single or double sided disks (or mixed).

Supports single or multiple drives.

Programs are catalogued from disk in order and merged into the file; no sort is required after filing.

SEARCH for disks or programs by name.

Look-up time from a cold start: under one minute; from a running program: 15 to 25 seconds!

List on screen or a printer in alphabetical order by program name or disk name.

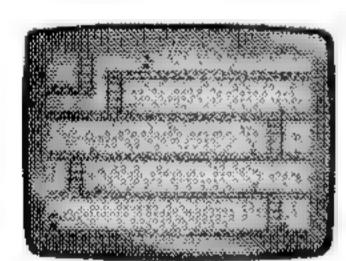
Up-date disks that have been changed by inserting into drive. Automatically replaces and up-dates old information.

May be used without a printer (on screen); file is portable and can be taken to a friend's for printing.

Supports any printer: serial or parallel.

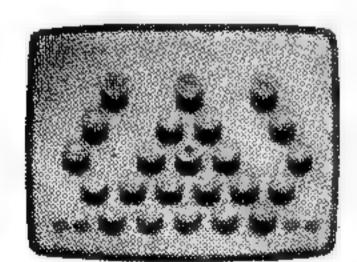
Diskette (only) ......\$15.00

### GAMES PAK/III



#### KONG

Help KONG fight his way to the top of the warehouse, avoiding rolling barrels and trap-doors. Save Roxanne from the bomb set in motion toward her by the villainous Igor. Six different screens. Joysticks. Cassette or Diskette ......\$15.00



#### BOUNCER

BOUNCER bounds from one trampoline to another, scoring points for clearing off the squares. He must avoid the arrows which will burst him. Six different screens. Uniquely coordinated sprites, graphics and sounds make BOUNCER so like a real arcade game, you will wonder why we didn't provide a slot for the quarters. Joysticks required.

Cassette or Diskette ..........\$15.00

#### ROMEO

ROMEO has a goal. But he must traverse the blazing desert dunes, swim a stream infested with alligators and sharks, and bolt through treacherous terrain for his just reward. Enough action to wear out a set of joysticks! Cassette or Diskette .....\$15.00

#### TYPWRITER

16K WORD PROCESSOR on Cassette or Disk

Any Imput/Output storage of fext — disk, cassette, cassette impatroisk output, or vice versa.

Selectable right justify.

Complete text Editing — by cursor control; including insert & delete lines, partial print, printer halt or abort without text loss, page FWD & BKWD, and more.

Complete Software Control of Printer (depending upon its capabilities) — for enhanced print, underlining, formatting, 28 to 254 characters per print line, etc.

No Special Equipment — monitor, console, Extended Basic module, C or D, printer.

Comes with a 20 page instruction booklet. Cassette \$32.00 Diskette \$35.00

ARTILLERY

The opposing force must be destroyed by

determining angle and force of each shot.

An ever-changing wind complicates mat-

ters. Play is between two players or one

player against the computer. Simulates

Cassette or Diskette ......\$9.95

**DE-CYPHER** 

An encrypted message is displayed and

guesses change all corresponding letters to

the guess, includes a help feature. Comes

Cassette or Diskette ......\$9.95

**PUZZLE 15** 

Move alphabetic squares (A to O) into the

single empty slot in an effort to arrange them

into order. The computer keeps track of the

number of moves taken to solve the puzzle

and scores of previous games are displayed

for comparison. Multiple squares may be

Cassette or Diskette ......\$9 95

FLIP CHECKERS

Outsmart the computer or an opponent by

getting all checkers flipped to your color

Computer determines its moves pleasingly

fast. A board game with no pieces to lose.

Cassette or Diskette ......\$9.95

SCREEN/DUMP

Print the screen to a dot-matrix printer. Does

not require extra memory! Disk version is

simple to use. Cassette version requires mild

Lessette or Diskette ..........\$12.00

with 50 messages which can be changed.

GAMES PAK/II

actual ballistic trajectories.

moved when appropriate

Joysticks required.

programming knowledge.

#### NAME-IT

DATA BASE for: Mail Lists, Labels, Files Records: 250 records per diskette consisting of up to nine 28-character items per record. Prompts: user designated prompts.

Complete File Sort: 250 records in 100 Seconds.

Search; Pre-set, print labels & lists.

Includes a FORM LETTER program that uses NAME-IT data in TYPWRITER generated form letters.

Cassette version differs from disk version Diskette \$35 00 Cassette \$32.00

NOTE: Should you decide to up-grade to the TI-WRITER module, TYPWRITER and NAME-IT data can be converted for use by that module. NAME-IT alone, will generate 250 TI-WRITER form letter records.

TI-WRITER is copyrighted software of Texas Instr.

#### GAMES PAK/I

#### FROGGY

Jump FROGGY across 10 lanes of traffic then across 6 logs; keyboard or joysticks. Fabulous sprite action!



Cassette or Diskette ......

#### EXTENDED BASEBALL

Joystick control of the pitcher and the batter, and individual batting averages that specifically effect the batting algorithm. Multi-base and multi-runner plays. Joysticks required. Cassette or Diskette ......\$9.95

#### **GORFIA PESTULITIS**

Joystick control of a laser sight or inertia influenced space mines to shoot down the invading Gorfians, Joysticks required. Cassette or Diskette .......\$9.95

#### **EXTENDED HANGMAN**

Quick graphics, music, color, speech (optional) and sound are added to keep the players entertained. Includes 580 words of 4 to 9 letters in length in easy, medium, and difficult groups.

Cassette or Diskette ...........\$9.95

#### TIC-TAC-TOE

Quick set-up and quick decision making at four levels of difficulty. The levels avoid the frustration of the novice never having a chance to win, while the most difficult level will challenge the pros. Cassette or Diskette ......\$9.95

A detailed catalog is available free. Circle "FREE" on the order form or send a letter or

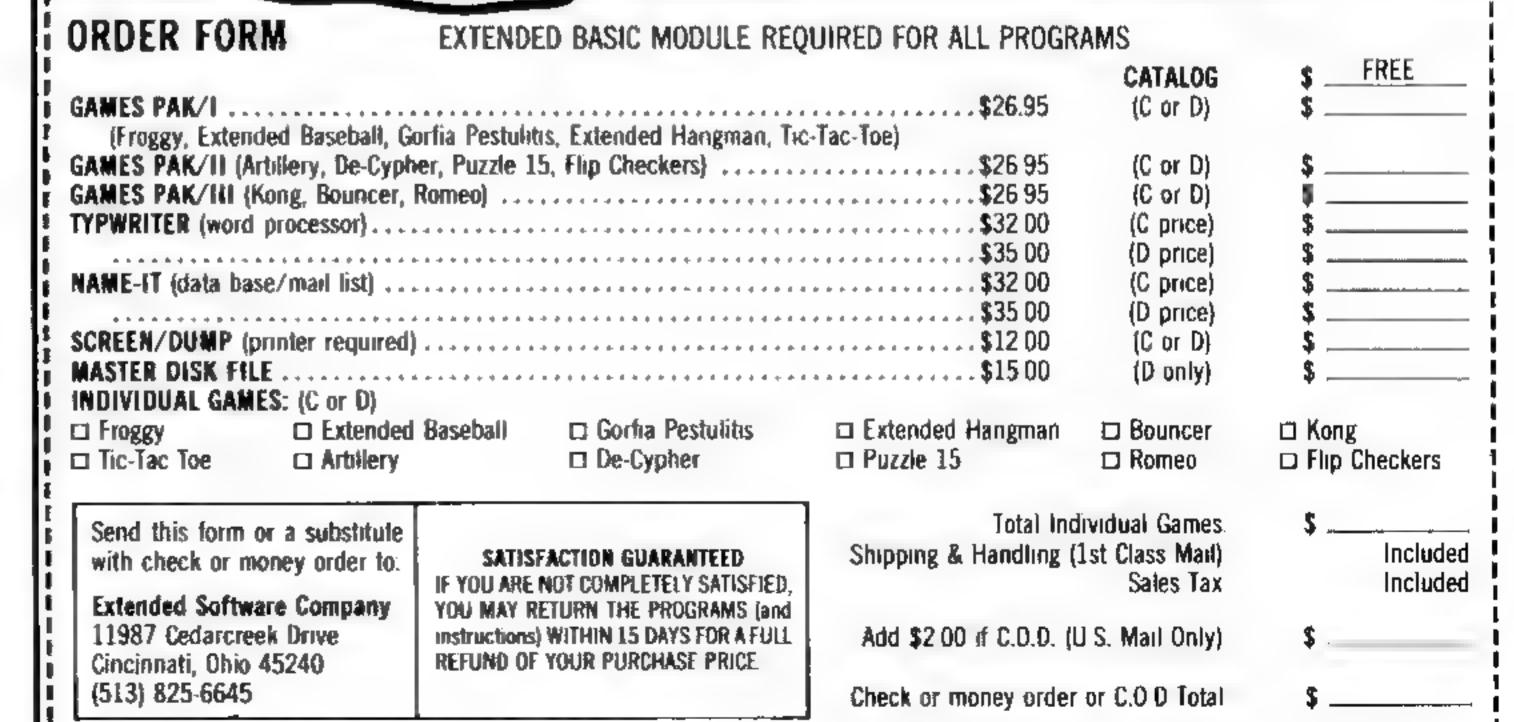
postcard.











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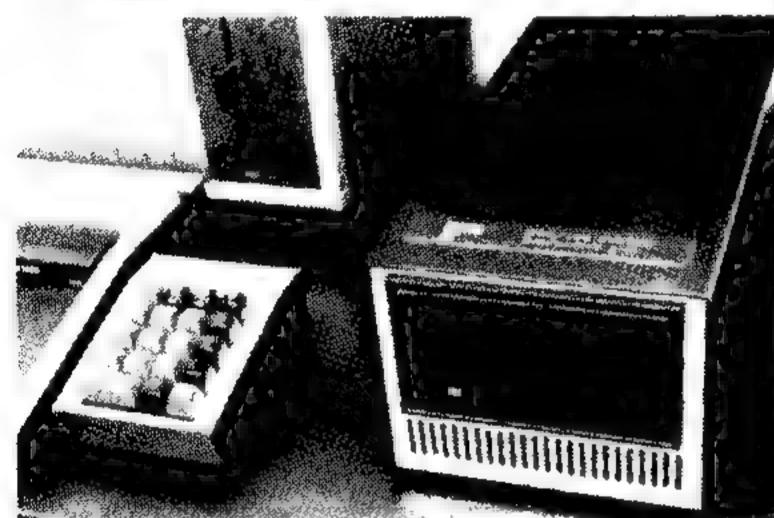
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99'er Home Computer Magazine is looking for articles in all areas of interest that concern Texas Instruments personal computers. Here are the kinds of articles that we want you to write for us:

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- Have you recently purchased a piece of hardware or software that hasn't quite come up to your expectations, or has, on the other hand, impressed you with its performance? We're looking for comprehensive product and book reviews from different perspectives.
- Are you an educator or parent with something to contribute to computer-assisted instruction (CAI)? We're always looking for new ideas and fresh approaches to educational problems.
- Have you created any unusual computer games or simulations? Let our readers experience your excitement and pleasure.
- Perhaps you've modified your microcomputer or have interfaced it with some unique or useful hardware. Send us your how-to-do-it story.

These are just some Ideas. Perhaps you have others. Don't worry if you're not a professional writer. Our editorial staff stands ready to help polish up your manuscripts. And we'll be more than happy to send you a copy of our author guidelines.

Please send your double-spaced typed manuscripts, plus disks or cassettes (recorded on both sides) if the article includes program material, to:

99'er Home Computer Magazine/Editorial Dept. 1500 Valley River Drive, Suite 250 Eugene, OR 97401

#### Cashflow Explanation of the Program

	Explana	ation of the Program
	Line Nos.	
	100-140	Program header.
	150-190	Program setup. Lines
		160-180 contain all the
		variable and subprogram
		names used in the pro-
		gram. This increases the
		speed of Extended
		BASIC's pre-scan func-
		tion, which is turned off
		in line 190. See the Ex-
		tended BASIC manual or
I	210 270	supplement for details.
I	210-270	Prints title screen.
	280	Opens CASHDATA file
I		in UPDATE mode (the
I	200 220	default value).
I	290-330	Prints menu.
I	340-650	Alters accounts.
I	660-670	Subroutine calls to enter
I	/00 <b>5</b> 00	new items.
	680-720	Deletes items.
	730-740	Subroutine calls to com-
	***	plete changes.
	750-960	Displays accounts.
I	970-1200	Accepts input data for
		accounts.
	1210-1300	Totals accounts.
	1310-1460	Prints data to
		CASHDATA file.
ļ	1470-1550	Inputs records from
		CASHDATA for
1		alterations.
	1560-1570	Displays "Work-
;		ing '' message.
1	LEAA ALAA	

#### Cashflow . . . from p. 21

Casni	tow from p. 21
	**********
	!* CASH FLOW *
120	! * * * * * * * * * * * * * * * * * * *
130	REM BY JOEL S. MOSKOWITZ
140	! 99'ER VERSION 2.10.1XB
150	DIM AK (16, 12), EX (12), 1\$ (16), IT
	(16, 12), MO (16, 4), MO# (16, 4), NF(
	12), X (16, 12), X\$ (16, 4), M\$ (16), P
	(12),SA(13),T(12),U(14)
BILLIAM DE CONTRACTOR DE LA CONTRACTOR DE CO	EALL CLEAR :: 6010 190 :: A ::
	A\$ :: B :: C :: DEL :: I :: K
	:: M :: PM :: PT :: R :: S ::
	SAY
176	CALL SCREEN :: CALL SOUND :: C
	ALL COLOR :: CALL CHAR :: CALL
	HCHAR :: CALL VCHAR :: CALL K
	EY
180	DATA JANUARY. FEBRUARY, MARCH. AP
	RIL, MAY, JUNE, JULY, AUGUST, SEPTE
	MRER, OCTOBER, NOVEMBER, DECEMBER
190	DEF RD(X)=INT(X+.5):: '0F-
296	IMAGE #####
	' TITLE SCREEN
	CALL SCREEN(11):: CALL COLOR(1
	4,2,13)
	CALL CHAR (95, "0000FF"):: CALL
	CHAR (134, "80703E1F07000000010E
	7CFBE0000000FFB0B7BABAB9B0FFFF
	0111A9A91101FF")
The second second	DISPLAY AT (9,11): "CASH FLOW": T
	AB (5);" ":
	FOR A=1 TO 24 STEP 23 :: FOR B
	=3 TO 30 STEP 5 :: CALL MCHAR(
	A, B, 134):: CALL HCHAR (A, B+1, 13)
	6):: CALL HCHAR (A, B+2, 137)
	CALL HCHAR (A, 8+3, 135):: NEXT B
	:: NEXT A :: CALL VCHAR(2,3,3
11 22 22 22	6,21):: CALL VCHAR(2,31,36,21)
	FOR M=1 TO 12 :: READ M& (M):
	NEXT M OPEN #1: "DSK1.CASHDATA", INTERN
	AL RELATIVE FIXED 255
	! MENU
	CALL CLEAR :: CALL SCREEN(B)

1	
1	1. SET UP NEW ACCOUNTS": :"
	1. SET UP NEW ACCOUNTS": :" 2. CHANGE ACCOUNTS": :" 3.
	DISPLAY ACCOUNTS": " 4. EN
	D PROBRAM"
:	CALL KEY (0, K, B) :: IF SEO DR KK
T.T	
,IT NP(	
J,P	
7,1	TABLE SET UP NEW ACCOUNTS
4 2 2	300 ! SET UP NEW ACCOUNTS 300 A≈0 :: GOSUB'980 :: GOSUB 1160
в K	** 5DSUB 1570 :: 605UB 1220
	SOTO SON
	SAG CHANGE ACCOUNTS
: 8	170 CALL CLEAR 28 50500 1480 28 50
ALL	5UB 1580 :: 605UB 1600 :: DISP
LK	LAY AT (22, 9): "READING DATA "
	:: GDSUB 1500
AP	1 380 DISPLAY AT (21, 1) BEEP: "PREBS: 1
PTE	TO ALTER ITEMS": TAB(B); "2. T
BER	
	TO DELETE ITEMS": TAB(B); "4. CH
,	ANGES COMPLETED"
- 1	CALL KEY(0,K,S):: IF S=0 DR KK
R(1	49 DR K>52 THEN 390 ELSE DN K-
	48 GDTD 410,670,690,740
LL.	ALTER ITEMS
10E	DISPLAY AT (21, 1): "ENTER THE NU
FFF	MBER OF THE ITEM": "YOU WANT TO
	CHANGE. IF YDUR": "CHANGES ARE
":T	COMPLETE,":"PRESS 707: 1"
_ H H	ACCEPT AT (24, 12) SIZE (-2) VALIDA
1	TE (DIGIT) BEEFEI :: IF I=0 THEN'
RB	GOSUB 660 :: GDTO 380 ELSE IF
AR (	#30 IF I< >A+1 THEN 470 ELSE DISPLA
, 13	Y AT (5,1) ERASE ALL: "PRESENT MO
	NTH: "; PM: : "AMDUNT BAVED: ";
T B	"5"; STR\$ (SAY)
21)	DISPLAY AT (22, 1) BEEP: "PRESS: 1
= :	TO ALTER": TAB(8); "2, TO CONT.
i li	INUE"
ERN	456 CALL KEY(0,K,S):: IF S=0 DR KK.
[ ]	49 DR K>50 THEN 450 ELSE IF K₽
1	49 THEN GOSUB 1160
d'A.	

Continued on p 51

1580-1610

ings messages.

Displays payments/sav-

# TI LASSOS DISK-BASED SOFTWARE ON "HIGHER FUNCTIONALITY" COMPUTERS

With the signing of Broderbund and Spinnaker to TI's much-publicized software licensing program--whereby TI translates the coding then manufactures/markets the ROM cartridges itself -the Texas giant has <u>initiated a new acquisitions policy</u> aimed at bringing over the best software, previously available only in disk implementation on "higher functionality" computers such as the Apple II. This move will secure for TI certain popular titles that can't be implemented on less-sophisticated cartridge

# BUSINESS SOFTWARE DEVELOPERS TO SLASH PRICES FOR HC MARKET

Developers of business/professional software for the \$2500 PC market are expected to slash prices on their \$300-\$700 productivity packages as they finally enter the upper-end of the under-\$1000 home computer market. To get retail prices down low enough, the purveyors of the word processing, spreadsheet, and database wares will most likely decrease the quality of the packaging and limit their low-cost line to "defeatured" versions requiring no support. In the HC market, analysts are predicting that personal database applications will far outself spreadsheets. 

# LOW-PRICED PRODUCTIVITY COMBOS CREATE PRINTER DURABILITY PROBLEMS

Although business applications such as word processing are migrating down from high-cost professional systems to mass-market implementations, new letter quality printers in this price range cannot be built as solidly as their more expensive cousins. Service engineers are concerned that consumers who operate small businesses and are eager to put their new systems "to serious work" may inadvertently over-tax printer duty cycles and cause premature failures by pushing equipment to do more than manufacturers have intended.

# TI SECURES 1-YEAR MARKET LEAD WITH MBX EXPANDER

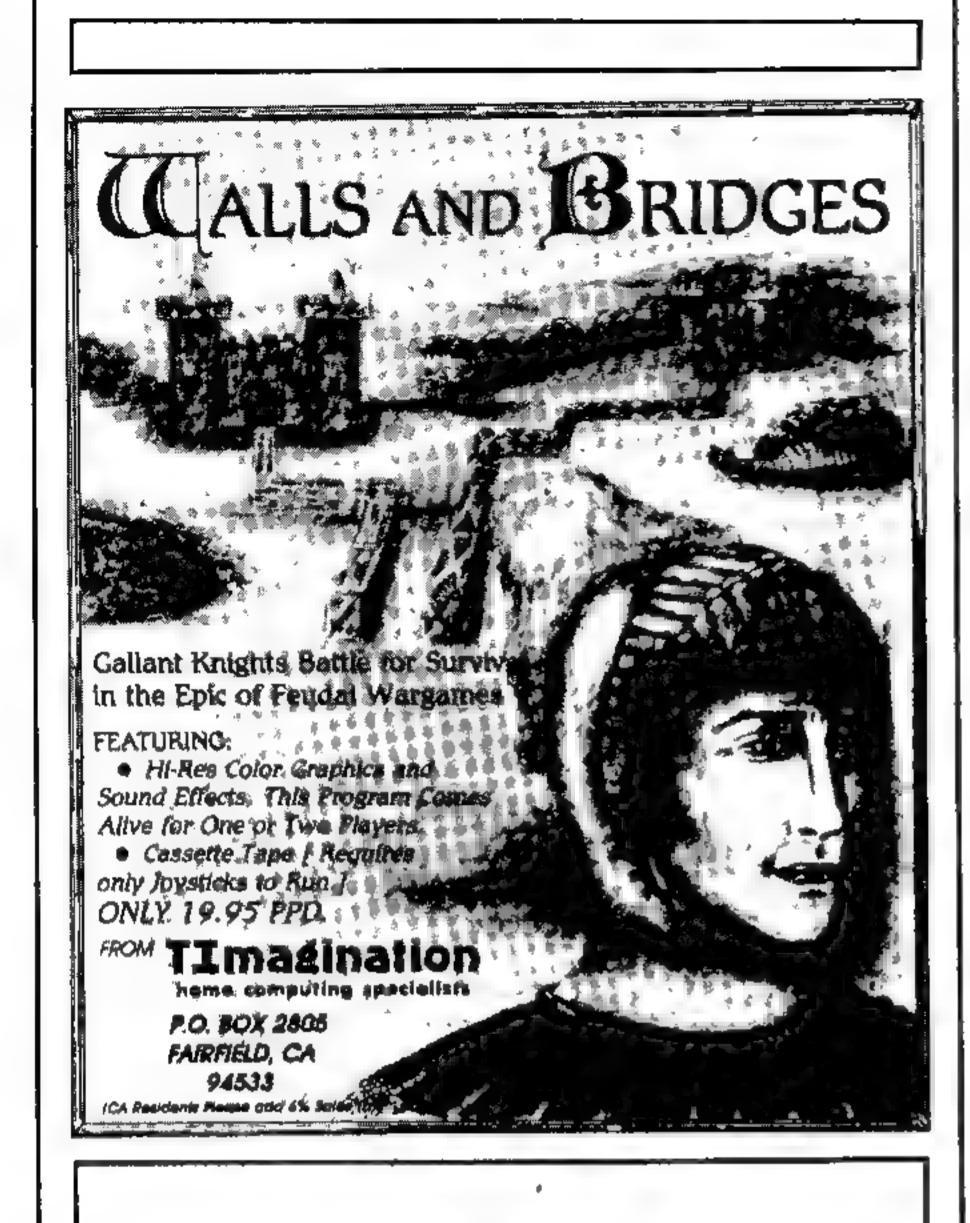
Although other big names in personal computing have been courting Milton Bradley to latch on to their speech recognition technology as implemented in the MBX Expander peripheral, MB's agreement with TI precludes another microcomputer implementation of MBX until the TIcompatible unit is on the market for I year. MB can and will release the Atari VCS video game version in time for holiday sales. The package marketed by Texas Instruments includes the keypad controller, a headset microphone, and one joystick unit at a suggested retail price of \$129.95. An additional joystick is available for \$39.95. The second joystick port on the keypad unit, coupled with the rotation capability (Theta control) in the firmware, suggests the possibility of "mouse-like" applications for the device in 1984.

# P-BOX PROMO AND CP/M AVAILABILITY TO DRIVE DISK USAGE

Significant new numbers of Home Computer users are expected to add floppy disk capability ds TI's promotion continues in full force. TI gives away a free Peripheral Expansion Box with the purchase of 3 cards or designated software packages. Additional impetus for HC users to obtain disk capability is expected to come from the recent announcement by Morning Star Software (of Beaverton, OR) of a CP/M processor board for TI's free P BOX, plus a CBASIC interpreter.

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#### Assemblers . . . from p. 17

use it for output from ASM2. If you have a printer, you can both LIST your source statements from BASIC with ASM1 loaded and produce an assembly listing with AMS3.

All this reading and saving on cassette causes the MAX Assembler to run slowly. For example, it took about 30 minutes to run ASM1 against the sprites sample program mentioned before, after the source code had been typed in and edited so that no syntax errors remained. It then took ASM2 another 50 minutes or so to load the Mini Memory with machine code.

#### The Dow Editor/Assembler John T. Dow 6360 Caton Pittsburgh, PA 15217 Cassette, \$25.00

The Dow Editor/Assembler is also a BASIC program which uses the console's RAM. As the name implies, it contains its own editor for Assembly Language source statements. To use the program, you use BASIC's OLD command to read it from tape and immediately RUN the program. The Dow Editor/Assembler comes to life and is ready to accept any of several commands:

NEW: start a new program.

SAVE: store the source program on tape.

OLD: read in a previously-saved source program from tape. LIST: list the source program with relative addresses on the thermal printer.

TITLE: view or change the program's title.

LOAD: load the machine code to the Mini Memory at the specified address.

LINK: call the machine-code program via BASIC's CALL LINK command, for testing purposes.

MINI: view or change contents of memory.

EDIT: use the Dow Editor on your source program.

To start entering a source program, you might enter NEW and then EDIT. The editor itself has several commands that let you move around in and change the source program. Typing E puts you into enter mode for putting new statements. into your source program. If you insert source statements, the program automatically moves any following statements down by adjusting their addresses. As you enter each source statement, the Dow Editor/Assembler will object to any syntax errors right away. Correct statements cause a "program" counter" to be incremented for the next statement, so you can see how many bytes of machine code have been generated so far. You can also delete source statements. You generally stay in edit mode until the source program looks just right, and then exit and SAVE your source program to tape. Then you use the LOAD command to make the assembler put the machine code into Mini Memory at the specified address. The LOAD portion of the processing for the sprites sample program took about five minutes.

The format of the Dow Editor/Assembler's source statements is fixed. (See Figure 1C for a sample.) The first three columns contain a label (of up to three characters), and there is a colon in column 4; you can have up to 40 labels. If a statement has no label, then the first four characters must be blank. Next comes the op code; all 9900 Assembly Language op codes except RT and NOP are supported. The operands start in column 10 and are separated by semicolons instead of commas (again, hard on old programmers but necessary because the assembler is written in BASIC). After these come the operands, which are similar in form to 9900 Assembly Language operands except that the symbol \$ (meaning the current location) cannot be used, and register operands must be preceded by R. The Dow Editor/Assember supports the assembler directives DATA, BYIE, IEXT, BTXI (to bias text characters by >60 for you, if your program will be called from BASIC later), BSS and EQU. After these fields, you may put some comments. When you press ENTER to tell the computer that the statement is finshed, there is a pause while the program processes the statement. An incorrect statement is rejected right after it is entered.

Continued on p. 61



### CAVERN QUEST

A Review By Greg Roberts

49 or HEM St. 11

Program Type: Malti-screen areade gam. Author, априори. Distributors

Joe Matchiaroli: Extended BASIC Moonbeam Software 2 Bridge St

Prices

Northampton, Ma. 01060 \$19.95 cassette or diskerte

Per digital allow light reveal [ke/b]

e os my first sook at Covern Chi I didn' see a navern at sector in 8 - 20 - citis - O. Heading strines suggested a pond file of y pads—as if to say that here was venother theaven for aid trug game. To yng closer attent until was intrigued o ind tune, s invabiled by menacing final idy as As spe unkild my were housely the dark and the dank from n 6 dats, ghosts scorp one and snakes low to avoid these dengers? Jump over them nationally a rick familiar to myone who has played Donkey Korn y si reset on in games design is nevitable, imited as we are by the lethnology, But there is nothing wrong with variations on a good idea (think or a gres and dogs) and he smattering of Kong in Cavern Question's one's rate richness of is pedigree.

Cavern Quest offers much more 141 I jump cope challenge it features three radically different screens-three separate games, really. After you in ake it through he four caverns of the fire screen, your second quest takes you o he edge of a botto niess oit you cross if by gelting a grip on some vines awing. ing by-and graboing them sprore the deadly spider c mas up to you Cinging to the vines, you must drop safely of the other side reaching he door of he

" a Cicham sec

In the Little act you fight off a pevy or reasts to wie their treasures. (The game holds to an intriguing old to kitradii un of dumb beasts guarding things they take no business caring about he the contents of King Kong's flst, A reasure aphears at the portion tettis of the screen, its point value displayed at the top of the screen. A so at the trig are three creatures who compete with you for the treasure. I you can destroy all three with your arrow, localed at the right of the screen and released via the mystick fire building you get the treasure Once you've achieved success, the game takes you back to the first screen

Continued on p. 37

August 1983

Computer Carning is a section for all game loversplayers, designers and programmers of microcomputer games Regular features include product reviews, fetters to the editor, player strategy, a rivertion and answer forum, a Hall of Fame for high scorors, autorial articles on gome design and programnung, plus interviews with professionals in the world goirtig, terugrips to

All submissions, for Pros on Programming are governed by the same conditions and payment rate as manuferipts with to puter departments of 99 er Home Computer Magazine Materials submitted for this features shown below are treated the takes for Copyright purposes as Lostons to the Editor in VP'er Home Computer Magazine (as explained in the Maschead). If chosen for publication, the material (excopt for 99 or Hall of Fance) will seen for its author a five computer game leither () or dilind-persy) und/or a pro-year subscription to this magniting

99 or Half of Fame candidates with high scores in Ti, third-party, or Computer Gaming games must completely describe the conditions under which their segres were achieved (i.e., skill level, keyboard or loyatick use screen number peruser purck-pution. apparance of screen etc. Candidates may not be a partly related to or affillated with the programmer of the game or the publishing firm. No competita tion will be provided to new inductions whose names are chosen to be immortalized. Facile is its own WHEN TO

#### Game Review Criteria

Came Performance measures how well the game responds to the player's commands, rates the quality and realism of the graphics and animasign, and examines how well the sound effects. mutic or speech are integrated into the garde is also determines whether the game delivers what is promised in its advertisements.

Engrossment focuses on this intangible and at rights on player are nearly or it seawhile the hours tick by unnoticed. The game a staying power is also assessed

Documentation rates the printed matter that comes with the game. It notes whether the instructions are clear comprehensive and easy to use whether the machine configuration t quirements are spelled out, and looks for such information as how to load the program, use the keyboard, and restaint the game



### 99'er Hall of Fame



Computer gameng devotees! We are delighted to announce that the recogni tion to which you have so long been and Lad a now yours. In I his history making issue of 99'er Home Computer Magazine we proudly display our 99'er Hall of Fame Certificate of Induction: From this day forward, all of you record-breakers (past, present and future) will receive your own aper all cert licate bearing your name, geme and outstanding score! Halt of Famors of the past will also be rown ded If they send in their current address as soon as possible. We'll verify your engibility and send you your certificate post hastet Aspiring Hell of Famers—send in those screen pictures and polish up your 6x10 frame to prepare to receive the coveted certificate which preserves your high acors for posterity. So, good luck, all of you game players possionately engiosoud in the pursuit of high scores. We d love to reserve a spot for you in the prestigious 99 or Half of Fame.

> We are proud to induct the following gamesters into the 99'er Hal. of Fame.

Name Jonathan Kalman, age 11 (Ontario, Canada)

Corn Attack

Scare 255 000 (leval 4)

Name Reddington (Paist na, 1)

Car Wate

Scale: 32 740

haron Pam Johnson, age 19 Orangavalo CA)

amen To neaders

o de 32 003

Name of Standard Stands (Pomeroy, OK)

Combatane City

ar un 6 597 850

Name Matthew O Conno (Vic or a, Australia)

**Само Разкос** 

Scure 2.984 100

Name Sain Earl age 4 (Carmal, N)

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si, it = 46,000.

Name Dwayne Williams, ago 14 Deta to Cattada:

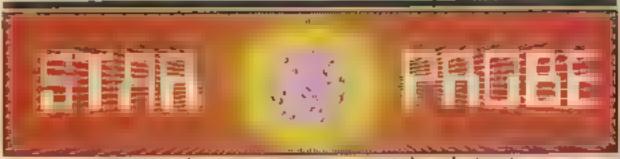
Samu Munchman

St C 249.520

Name Rober Weach, Sr (Milwaukee, WI)

Garne Moor buse

St 6 128,500



A Review by Ezin O'Connor & Deborah Amily

Vame. Author Language Distribution

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ay out in the galaxy hovering nyer a small moon in it Camma-Hydra system you starprobe is poised, rearly to descend into who knows with helanous Xycitan activity in their underground may a base. You are carm because you don! tace any personal danger. Your remote control via line N. C. (Nears infinite Communications. Beam will guide the still probe down into a cave on this moon. Your mission is to knack but he threm of Xyolian attack. When the prope reaches the Xyor an cave it must thread

Continued on p 80

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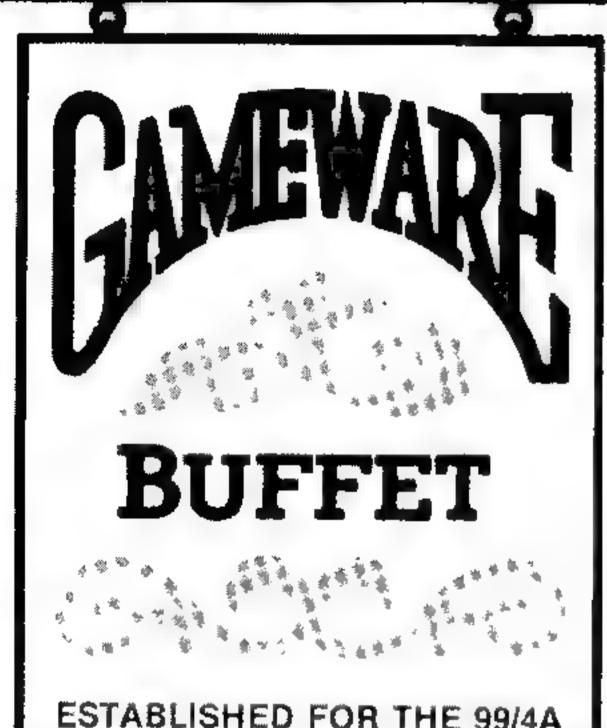
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By Michael McCue

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he dense, dark Brazilian jungle turns and twists menacingly, but you are not afraid. You know that the acid pits, rolling logs, hungry cannibals, slithering snakes and sudden bonfires are only temporary hazards thrust upon you to test your persistence and prevent you from gathering the giant diamonds which lie in the bush.

Not only can you rise above these obstacles by jumping over them, but you have allies in the trees. Benevolent monkeys will appear to rescue you from perilous pits, spiriting you up gently and musically above the bubbling acidic ooze. If you can catch one, a prehensile-tailed deliverer will carry you through the trees beyond harm. Thanks to them and your own athletic prowess, you can gather piles of the sparkling diamonds and rack up quite a fortune to show for your time spent in this jungle adventure,

This game has bright appealing graphics to keep your spirits high. All the action takes place in front of a three-dimensional backdrop of jungle complete with trees, flowers, grass and mountains. Even the obstacles you encounter are visually enter

taining as they try to thwart your diamond gathering mission.

It's a Jungle Out There

The dangers you encounter on your way to wealth and high scores will put your reflexes to a real test. Particularly treacherous are the cannibals and rolling logs. To avoid these hazards, you must jump over them by pressing [I] on your keyboard. The arrow keys [S] and [D] move Jungle Jim backwards and forwards. To grab a diamond you need only to run past it.

The acid pits provide a real challenge. You cannot jump over them; instead you must jump up and grab onto a passing monkey—a bit like catching the brass ring on a merry-go-round. To do this, press [I] and release it as soon as you are in the air. If you have the right touch and have jumped under the monkey, it will carry you safely across the pits—or any other hazard. You can boogie through the trees forever, but when you do want down, simply press any key to be released. Once you have run the full length of the screen, you will automatically be transported to the next one.

#### **Behind the Screens**

In creating Jungle Jim my goal was to come up with a new COINC routine and a new key scan set-up in a game that wasn't a space shoot'em up exercise. After many hours of programming, I came up

with a game I think you'll find fast, fun and challenging, with exacting coincidence checks. All that remains for you to do now is power up your TI and key in Jungle Jim.

A Challenge

Now that you're privy to all the goings on in the jungle, prepare to collect precious gems while you jump and jog your Jungle Jim to new heights. Before you pack up your belongings and bid civilization adieu, here's a challenge to you from our editors: Anyone who can beat our Jungle Jim record of 1500 points (and send us a screen photograph verifying the score) will receive special mention in an upcoming issue and will be inducted into the "99'er Hall of Fame." So, go for it, treasure hunters! We'll see you in the jungle and maybe even in the record books!

EXTENDED BASIC

Jungle Jim Explanation Of The Program

Line Nos. 100-210 220-260

Program header. Sets flag for first play; branches to subroutines for first play or replay.

270-310 320-470 Displays game scene.
Controls movement of
Jungle Jim and obstacles;
determines if Jungle Jim
has run into an obstacle.

Continued on p. 38

# Counting

#### By Rolynda Brantley

+282 Taos Drive San Deigo, CA 92117

ou and your best friend are in an enchanted toy chest counting your favorite playtnings over and over. The toys in this toy chest never break and never get lost. In fact, the more you play with these toys the more toys you seem to have.

Does this sound like a preschooler's dream? Well, in a way it is. Counting Fun began as a way to mot vate my three-year-old daugnter to learn to count. Since I wanted her to be drawn into the program, I began by designing pictorial representations of her favorite things: ducks, hearts, school buses and her special pal, E.T. My artistic talents leave a lot to be desired. But even though E.T. looks more like a gas pump than an appealing alien, Karen loves nam. Together they conquer counting and number concepts while playing in the never-empty toy chest that is our TI-99/4A.

Let's Play

Ine screen displays two lines of toys, with 0 to 5 toys in each line. Each toy announces its appearance with its own unique sound. The bus, for example, honks its horn. Those who have a Speech Synthesizer might want to have E.T. say his famous line when he comes on the screen.

The computer asks HOW MANY and displays three miniature pictures of the toy the child is supposed to count in the two lines above. The child, therefore, does not have to be able to read to enjoy doing this program activity by himself. Correct answers receive an audio and visual reward. An incorrect answer is indicated by a different tone and followed by a display of the correct answer.

After the questions have been asked and answered, an encouraging message designed to personalize the game and boost the learner's self-esteem appears. The message I LOVE YOU not only accomplishes both of the above goals, but it is also a friendly, easily recognizable message for any child to read. You may want to change the messages from time to time after your preschooler has learned to recognize them.

The game is very friendly, and young children will have few problems playing it by themselves. All they need to do is press a number key and [ENTFR] to go on to the next problem. Although children will feel independent when they can play this computer game by themselves, it is still



special for them to have Mom or Dadclose by to appreciate the wonders of their learning accomplishments.

Play's the Thing

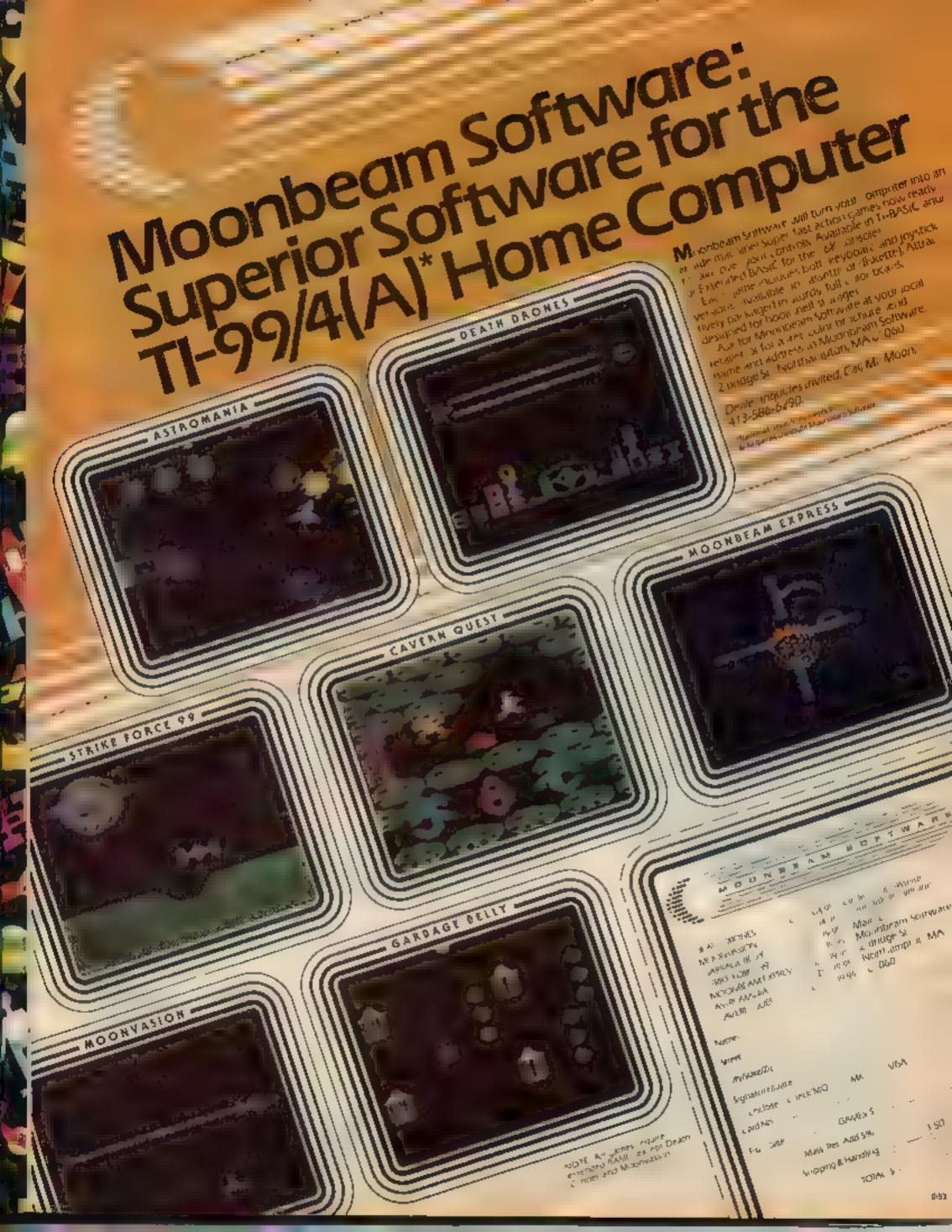
Our children's fascination with this new technological toy can help them learn all manner of things from letter and number

Concepts to exercising their imaginations. You can personalize Counting Fun with your child's favorite toys and appropriate reward messages, and then just watch the magic happen. If you get a chance, do "phone home" and let us in on the Counting Fun in your household.

BASIC	Counting Fun
Exp	lanation of the Program
Line Nos.	Decree to the
100-160	Program header.
170-200	Clear screen, input name,
	and set starting values for
	variables. (F # of right
	answers) (W # of wrong
210-270	answers) Initialize colors for
210-270	character sets.
280-600	Initialize character
2007-000	patterns.
610-670	Set starting values and
010-070	clear screen.
680-900	Pick random characters
	and random number of
	characters and place on
	screen using subprograms.
910-1470	Ask questions and input
	responses.
1480-1500	Print total of right and
	wrong responses.
1510-1520	Input to start game over.
1530-1950	Subprograms to make
	characters.
1960-2030	Subprograms to make dif-
	ferent sounds for right or
	wrong answers.

ting F	fun in your household.
1100	REM *************
	REM * COUNTING FUN *
	REM # BY #
	REM * ROLYNDA BRANTLEY * REM **************
	REM 99'ER VERSION 2.10.1
	FOE M
	CALL CLEAR
180	INPUT "WHAT IS YOUR NAME?" ":K4
190	W=0
	F=0 .
	ICALL SCREEN(B)
	DALL COLOR (10, 9, 1)
	CALL COLOR(11,9,1) (CALL COLOR(13,7,1)
	CALL COLOR(14,11,1)
	CALL COLOR (15, 2, 1)
	CALL COLOR (16, 16, 1)
	A4="FFFFFFFFFFFF"
1 11 11 11 11 11 11	CALL CHAR (128, "387CFEFFFF7F7F3
	(F")
	CALL CHAR(129, "071F3F7FFFFFFFF
	E")
	CALL CHAR (130, "0000000000000")
	CALL CHAR (131, "3F1F1F0F0F07070")
1,14,48	CALL CHAR (132, "FIEF CFICE SFIEF WERE
	(%")
340	CALL CHAR(133, "030101")
350	CALL CHAR(134, "E0C0C08")
340	CALL CHAR (136, "FFOFOFOFOFOFOF
	F")
	CALL CHAR (137, "FF0303030303036
	CALL CHAR (1,3/9, "3F3F3F3F3F3F3F3F
	(F*)
594	CALL CHAR(13B, A\$)
	CALL CHAR(144, "FF7E3C")

Continued on p. 42





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dury a cut 99 cm or the intelligible state W. Elected Science and the site of the federal

ASK FOR IT FROM YOUR FAVORITE.

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ASK WHY?



# **SHOW TREK**

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# Cavern Quest . . . from p. 29

and you have to jump over the beasts again. But this time your quest will be harder necause of a "claw monster" hanging from the ceiling. This new addition to the cavern seemed an impossible obstacle until I realized that I had to run packwards after jumping over each beast in that first onrushing line. Then, when the long space opened up after the third beast, I ran under the claw monster as fast as my joystick could carry me.

Fazed by Phase Two

Negotiating the remaining cavernwork on the first screen, and quickly gliding through the vine sequence of the second, you try for another, more valuable treasure by killing monsters with your longoow. If you succeed, you return to the cavern to find—you guessed it—a second claw monster. Such is the challenge; with each treasure recovered, the cave sprouts a new horror, until you've taken on twenty claw monsters (plus untold thousands of other beasts) and saved up twenty treasures. At this point the quest would seem impossible to anyone but a thorough video loco.

The game can be frustrating at first. While I was running it for review, several people in this office stopped by and took a turn with the joysticks, each one giving up long before they could see the light at the end of the tunnel. For my part, there must have been a little of the General Westmoreland in me, and I dug

in for a while, concentrating on timing the jumps. After a half-hour of practice I could consistently get to the second screen within a few minutes. Riding that magic vine and shooting the monsters with arrows is really not very difficult; it provides a relaxing interlude between the maddening forays through caverns—an engaging feature that shows the overall high quality of this software. The designers of this game are definitely onto the right recipe for difficulty: they know that a simple game soon gets boring and ends up in a drawer, whereas a very difficult game can meet the same fate without ever being played through to the end. To hit the middle mark is a rare achievement, one that even the expensive Command Cartridges sometimes miss. Cavern Quest can get very tricky, but only the impatient and clumsy need despair.

What the game does lack is stunning graphics. You definitely will not confuse these screens with the Technicolor bravura of an uptown arcade game, No. here the monsters are tiny, simplydefined little beasts, and the appearance of the ubiquitous computer ghost with two eyes is almost annoying. Sure, ghosts are easy to make in second grade we cut lots of them out of white paper but we're expected to move on. aren't we? And the vines, bottomless pit, and magic room are blockier than a Mondrian painting. Nevertheless, the action of the game more than redeems the simplicity of the playing field. After all,

would we go to a football game to find beauty in billboards and Astroturf?

Considering the high quality of the game and the slick packaging it comes in (a sturdy four-color carton), the documentation is surprisingly thin; in fact, it's about as well-produced as a grocery-store flyer, and confusing to boot. It fails, for example, to state specifically that the joystick fire button makes your figure jump to the vines and then to the ledge. Neither does it tell you exactly how you acquire the series of treasures—that you have to keep going through screen one in order to try for the next prize. Fortunately, however, you leave all confusion behind as soon as you've stumbled through the screens a time or two.

Cavern Quest is well composed from beginning to end. Like a concerto, the three 'movements' of this piece are distinctive, while still holding their continuity via the intricate quest theme in every screen and in the recapitulations to screen one. For its price I know of no other game of equal interest.

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# Jungle Jim ... from p. 32

	·
480-710	Selects obstacles randomly and displays them.
720	
720	Branches to music
	subroutine.
730-740	Increases score if Jungle
	Jim gets diamond.
750-850	_
730-630	Decreases number of re-
	maining Jungle Jims and
	checks for replay if no
	Jungle Jims left.
070.050	
860-950	Plays musical theme.
960-1110	Defines characters for initial
	title screen and displays
	them.
1120-1390	Redefines characters for
	first play or replay, and
	locates them on the screen.
1400-1450	Redefines characters for
1400-1420	**
	first play.
1460-1500	Displays messages.



LL SPRITE(#1,92,16,104,60)

of the same is the surface of the same of the same and the same in the same of the same of

ISMA CALL KEY(0, T.ST):: CALL COINC! ALL, HIT) :: IF HIT=-1 THEN CALL COINC(#1,#10,32,IT):: IF IT= 1 THEN GOSUB 730 ELSE GOTO 750 CONTROL LOOP 漆漆樹 IF ST=0 THEN CALL MOTION(#1,0, 0):: HV=0 :: 50TO 320 |勝機機器CALL POSITION(#1,X,Y):: IF Y>2 04 THEN 460 ELSE IF Y<60 THEN CALL SOUND:(1,110,1,112,2,114,3 ):: CALL LOCATE(#1, X, 60) 講論 IF T=6B THEN HV=10 :: CALL PAT TERN(#1,C):: C=C-4 :: CALL MOT |ION(#1,0,10):: IF C<=92 THEN 0 =112 :: GOTO 320 ELSE 320 TTERN(#1.C):: C=C-4 :: CALL MO TION(#1,0,-10):: IF  $C \leftarrow 92$  THEN C=112 :: GOTO 320 ELSE 320 脚樹柳||CALL MOTION(#1,0,0):: HV=0 :| IGOTO 320 解微制 FOR D=1 TO 20 STEP 4 :: CALL S DUND(-310,-3,D):: CALL CDINC(# 1, #7, 17, HIT):: IF HIT=-1 THEN CALL MOTION(#1,0,10): HV=0 : . GOTO 710 410 NEXT D #某物:CALL MOTION(#1,24,HV率1.5) 勝勝勝⊪FOR D=1 可D 6 si CALL, COINC(#1, #7,17,HIT):: IF HIT≕-1 THEN CA LL MOTION (#1,0,10):: GOTO 710 OCATE(#1,104,Y):: 60TO 320 · ATE (#1, 104, 60); : FOR [#2 TO 18 :: CALL DELISPRITE (#I):: NEXT I ss COL=COL+1 ss IF COL=11 TH EN COL=14 WYW IF COL=16 THEN COL=5 #80 CALL COLOR (7, COL, 11) 機物的 EA=RRND(占):: IF EA=1 THEN GDSU B 640 :: 60TD 320 TRERRIDGAD: IF TREI THEN GOSL B 660 S=RRND(50): IF 5=1 THEN 5VP0: : GDSUB 670 1: A=INT (RND \* 15) +1 :: IF A=1 THEN GOSUB 650 :: F 070 320 ELSE 320 「数数数 FI=RKND(5):: IF FI=1 THEN 60SU B 690 :: A⊨RKND(10):: IF A⊨1 | HEN GOSUS 650 :: 6010 320 ELSE 320 NT (RMD \$50) -30 :: GOSUB 670 :: A=RRND(B):: IF A=1 THEN GOSUB 650 :: GOTTO 320 ELSE 320 SAM P=RRND(2): IF P=1 THEN PV=0

: 605UB 580 :: 60SUB 450 :: 60

TO 320

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# Lerrnd(1):: IF L=1 AND TR<>1 T HEN GDSUB 610 MERRND(4):: IF M=1 AND L<>1 TH EN GDSUB 650 :: GOTO 320: STO GDTO 320 CALL CHAR(116,C1\$):: CALL CHAR (120,C2\$):: CALL CHAR(124,C3\$) CALL SPRITE(#2,116,5,120,96,0, PV,#3,120,5,120,128,0,FV;#4,12 4,5,120,160,0,FV; RETURN 610 REM 620 FOR I=2 TO 3 :: CALL SPRITE(#I ,128,9,112,(I\*64+B)-20,0,-20): : NEXT I

: NEXT I A30 RETURN CALL SPRITE(#2,44,5,104,240,0,

20,#3,44,7,104,160,0,20):: RET URN CALL SPRITE(#7,140,10,59,120,0

,10):: RETURN CALL SPRITE (#10,132,16,96,216)

:: RETURN: :: CHAR (116, "000C3A071F"&X\*&

2,14\*8,INT(RND\*14)\*8+100,0,5V)
: RETURN
CALL CHAR(116, "000007002406272

735355D6AA2E6955A40200020B0B0F BFBFAED6D89BF96B59">

FIND#14) #8+100) :: RETURN

CALL KEY(0,V,CV):: IF CVK>0 THE EN CALL MOTION(#1,0,0):: CALL POSITION(#1,X,Y):: CALL LOCATE (#1,13\*8,Y):: CV,V=0 :: GOTO 3

TE=2 :: GOTO 860

CALL SOUND (500,500,1,504,2,508,3):: CALL DELSPRITE (#10):: SC = SC+250 :: DISPLAY AT(1,1)SIZE (LEN(STR#(SC))+1):SC :: CALL V CHAR(1,3,33)

RETURN

REM

THE T,ST=0 :: CALL MOTION(#1,0,0)

TO FOR I=510 TO 110 STEP -100 ::

CALL SOUND(1,1,1,1+2,2,1+4,3):

: NEXT I

### GUY=GUY-1 :: DISPLAY AT[(2,1)SI ZE(-2):GUY :: CALL VCHAR(2,3,3 3):: IF GUY<>0 THEN CALL LOCAT E(#1,104,45):: GOTO 330

CALL SOUND (2300,220,1,222,2,22 4,3):: CALL CLEAR :: CALL CHAR SET :: IF EA=1 THEN CALL DELSP RITE (#2,#3)

BOOK A\$ (1) = B\$&"ALL YOUR MEN WERE DE STROYED AND YOU ONLY SCORED "L STR\$ (SC) &" POINTS."

- 相談(A\$(2)=B\$&"BETTER LUCK NEXT TIM
- B20 A\*(3)=B\*&"WANT TO FLAY AGAIN?

830 TE=1 :: GOSUB 1460

840 CALL KEY(0,K,STAT):: IF NOT(K= 189 OR K=78) THEN 840 ELSE IF K= 78 THEN STOP

G50 CALL DELSPRITE (ALL):: TIME=2 :

860 READ TP, FR :: ON FR GOTO 880, B

870 RESTORE 910 :: GOTO 860

CALL SOUND (100, TP, 1, TP+2, 2, TF+3, 3):: CALL SOUND (100, 165, 1, 196, 1, 262, 1):: ON TE GOTO 1480, 7

890 CALL SOUND (100, TP, 1, TP+2, 2, TP+4, 3):: CALL SOUND (100, 175, 1, 22 0, 1, 262, 1):: ON TE GOTO 1480, 7

700 CALL SOUND (100, TP, 1, TP+2, 2, TP+4, 3):: CALL SOUND (100, 196, 1, 247, 1, 294, 1):: DN TE GOTO 1480, 7

910 DATA 262,1,330,1,392,1,440,1,4 66,1,370,1,392,1,330,1,349,2,4 40,2,523,2,587,2,622,2

928 DATA 494,2,523,2,440,2,392,3,4 94,3,587,3,659,3,698,3,554,3,5 87,3,494,3

936 DATA 349,2,440,2,523,2,587,2,6 22,2,494,2,523,2,440,2,262,1,3 30,1,392,1,440,1,466,1

940 DATA 370,1,392,1,330,1,262,1,1 96,1,262,1,196,1,262,1,196,1,2 62,1,262,1,294,1,330,1

950 DATA 349,2,262,2,349,2,262,2,3 49,2,262,2,349,2,349,2,330,2,2 94,2,262,1,196,1,4,4

948 VD≃28 :: Z\$=RPT\$("0",16):: CAL L CHAR(140,"000001010F09090901 0101013E200000C0C4C4FCC0C0C0C0C C020100808102030")

FT\$ ("0", 13)&"31FFF1F03"&R

### C2#=RPT#("0",7)&"3"&RPT#("F",1 8)&"03"&RPT#("0",10)&"C0"&RPT# ("F",18)

**990** C3s=RPT\$("0",10)&"FC"&RPT\$("F" ,11)&"C0000"&Z\$&"C0FBFFFBF"

1600 C=96 :: C2=104 :: X\$=RPT\$("0", 12):: Y=6 :: CALL CLEAR :: DI6 PLAY AT(12,1): "PRESS ANY KEY TO STOP ANY GRAPHICS DISP LAYS."

1010 FOR D=1 TO 500 :: NEXT D :: CALL CHAR (36, X4 LL SCREEN (2):: CALL CHAR (36, X4 LP 000C1F1C1C1C0C0C0702"&Z#&"01 02FCC8908488131654"):: CALL CLEAR

Continued on p. 42

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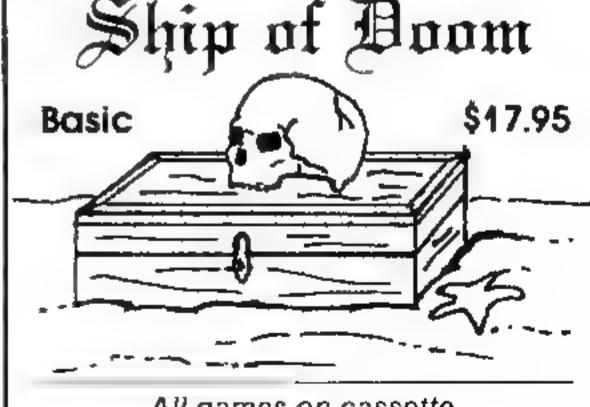


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# PEHPHEHAL USIGN 99

The choice in microcomputer peripherals keeps getting better all the time—helping you to get more out of your Home Computer. In this review feature, 99'er HCM will look at new hardware products that we feel can expand our readers' peripheral vision.

STX-80 Thermal Printer Star Micronics, Inc. 200 Park Avenue New York, NY 10166

\$199.00 with Parallel Interface (Serial interface not yet available) \$9.95 for two rolls of thermal paper (200 feet)

A quality printer for under \$200? Just a year or two ago, the idea would have seemed impossible. But now that we've seen Star Micronics' new STX-80, we are reminded again that good things can indeed come in small packages.

The first thing you notice about the STX-80 is that it takes up only about half the space of most other printers. Weighing 7.5 lbs and measuring 14" by 7.5" by 4", it's a compact package.

At 60 characters per second, the STX-80 is almost as fast as many of the more costly printers. Like those more expensive models, it is bi-directional, logic seeking, and allows bit-image graphics programming. Because it uses thermal paper, it is quieter than dot matrix impact printers, many of which can be quite noisy.

Loading is extremely simple, using thermal paper which comes on a 100-foot roll. Just drop in the roll, feed the paper into the inlet, and you're ready to print. Personally, I find this paper's tendency to curl up a bit annoying, but it can be flattened, and the print does photocopy well. It is about five times as expensive as the non-thermal paper, but this cost is partly negated because the STX-80 has no ribbon cartridge to replace periodically.

The most surprising thing about this low-cost printer is the high quality of print, its resolution and tracking are at least as good as that of a dot matrix impact printer, which may be three or four times as expensive. In normal print mode, which uses a 5 × 9 matrix,

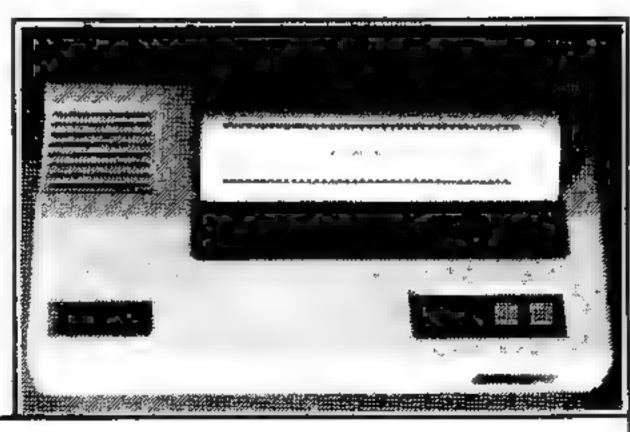
NOTE: The cable you use to connect the STX-80 parallel port to the TI parallel port must connect STX-80 pin 11 to TI pin 10, and STX-80 pin 16 to TI pin 11. If your cable is not configured this way at present, it must be modified.

with the preferred true descenders (full-length tails on the p's and q's). The STX-80 also features enlarged printing and a bit-image graphics mode, using a 6 × 6 matrix, as well as a standard set of block graphics. All of the borders shown in the box were generated using the standard block characters and a few lines of code. Even the finest patterns are printed with a high degree of precision.

Our STX-80 came with a preliminary users' manual which was adequate for us, but would not be very helpful to someone who needs help in setting printing control codes—especially for the graphics mode. We hope the production version of the manual will be more in line with the general quality of the printer.

We were pleased to see that Star Micronics chose not to sacrifice quality in bringing the price of line printers under \$200. The STX-80 is quick, precise, very quiet and easy to use. For someone looking for these features, the STX-80 compares well with any printer, at any price.

-Will Schick





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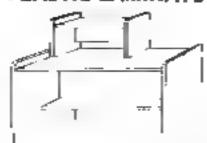
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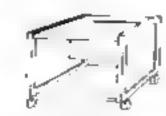
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# Jungle Jim . . . from p. 39

F0000E0FEFFFFFFF000020F0FCFFF FFF10183C7C7EFEFFFF")

關例等時 CALL MAGNIFY(4):: CALL SPRITE( #28, 140, 16, 10\*8, 15**\***8)

1040 CALL CHARSET :: FOR 1=1 TO 14 :: CALL DOLOR(I,14,1):: NEXT I :: DISPLAY AT(1,9): "JUNGLE JI

1056 B\$=RPT\$(" ", 28)

#660 CALL CHAR (132, "18245ADBDB5D241 80"&Z\$&Z\$)

1070 A\*(1)=B\*&"99'ER MAGAZINE PRESE NTS . . . JUNGLE JIM

A\$(2)=B\$&"YOU MUST JUMP OVER T HE OBSTACLES BY PRESSING "I".

TO MOVE, USE THE LEFT AND RIG HT ARROW KEYS." 1070 A\* (3)=B\*&"YOU GET 4 MEN, AND Y

OU SCORE POINTS BY GRABBING TH E DIAMOND."

1190 RESTORE 910 :: TE=1 :: GDSUB 1

DELSPRITE (ALL)

1120 GUY=4 :: SC=0

1130 CALL CHAR (BO, "00183C3E3F1F0F02 061F3F3F3E3E100000001C3E7EFEFC 7870F8FCFCBCBCB88")

1140 CALL CHAR (BB, "00000000000607030 04090A0EAFFFFFFB0B0B090BBFBF0E 08182AAAB5FFFFFFFFF")

FOR I=1 TO 14 :: CALL COLOR(I, 1.1) :: NEXT I

1140 CALL CHAR (140, "00010F0F0F13162 A29"&RPT\$("20",5)&"A0E01CF4DEC

6E03030282824"&RFT\$("0",12)) 1170 CALL CHAR (128, 7\$&"010307040808 0B070000003C7C7CFCFBF0F0E04040

40日") 1100 CALL CHAR (33, RPT\$ ("F", 16)):= C ALL COLOR(1,1,1):: CALL HCHAR( 1,1,33,3249)

CALL CHAR (34, "FFFFFFFFFFF7F3F07 0703030307070701FF7F1F1F070301 @@FFFFFFFFFCFCFCFC")

1200 CALL CHAR (3B, "FOFOFOE")

1210 DATA 7,1,34,8,1,35,9,2,36,8,6, 37, 9, 6, 38

1220 FOR D=1 TO 30 STEP 6

1230 RESTORE 1210

1240 CALL HCHAR(9,D+1,32):: FOR I=1 TO 5 :: READ A, B, C :: CALL HC HAR(A,B+D,C):: NEXT I

1250 NEXT D

1240 CALL VCHAR (7, 1, 32, 3):: CALL VC HAR(7,32,32,3):: CALL SCREEN(6)

PT# ("F", 17) & "SOCIOCOE OE OF OF BFF

DATA 10, 3, 41, 4, 10, 4, 41, 4, 13, 2, 40,1,13,5,42,1

03030204043B2000B0B4FEB4F08BB B0B0C020101010101B")

ALL HCHAR (11, 1, 50, 32 x 13)

FOR D=1 TO 32 STEP 4

M高級側 | CALL | HICHAR (14, D+2, 88):: CALL CHAR (14, D), 87):: |CALL HICHAR (14) D+3,90):: CALL HCHAR (14, D+1, 9) ) sit NEXT D

FOR F=1 TO 30 STEP 6 :: RESTOR E 1280

# FDR I=1 TO 4 :: READ A, B, C, D: : CALL VCHAR (A, B+F+1, C, D) : IN

KSSO NEXT F

# SAM FOR D=1 TO 32 STEP 2 : CALL CHAR (21, D, 80) :: CALL HCHAR (22, D, B1) : : | CALL | HCHAR (21, D+1, 82) : CALL HCHAR (22, D+1, B3)

Maxim CALL HCHAR (23, D, 88) il CALL HC PR (24, D, 89) : CALL HCHAR (23, D) 1,90):: CALL HCHAR (24, D+1,91) : NEXT D

010101013E200000C0C4C4FCC0C0C COCO20100808102030")

脚部原物 ||CALL: MAGNIFY(4)|e/s IF ||TIME<>1 || HEN RETURN

9393933F29999999BBBBBBBBBBBBBB B0B0B00000B0402030")

### CALL CHAR (100, "100000101070909 501010101061810000C0C0CZF4CBC0C 9C0C020100B0B10203")

##28 CALL CHAR (104, "0000010101070503) 10101010102020203C0C0C0C0E0E0F6C @C@C@2@2@1@1@2@4@6")

10101010000070400C0C0C0E0E0E0E0

OCOCO4040COCOA0BOC,") 1440 CALL CHAR(112, "0000010107070% 50101000007040000C0C0C0E0E0FB

900004000040A010203") MASS RETURN

#460 CALL CHAR (120, X\$&"FF") ## CALL HCHAR (5, 1, 120, 32):: FOR [ =1 TO 3 :: FOR I=1 TO LEN(AN) ))STEP; 3 s ≥ F\$=SEG\$(A\$(D), I, 24 ):: DISPLAY AT (4, 1): F\$ :: GOTT

860

### CALL KEY(0, T, S);; IF S⊨0 THEN 1490 ELSE 1500

作名字物 NEXT I :: NEXT D

1500 CALL VCHAR (1, 1, 32, 768):: RETUR

Whitmore Lake, MI. 48189

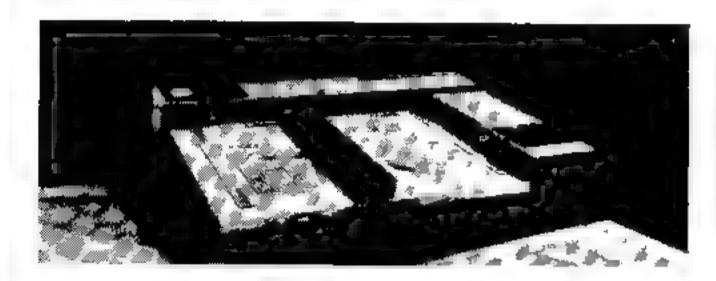
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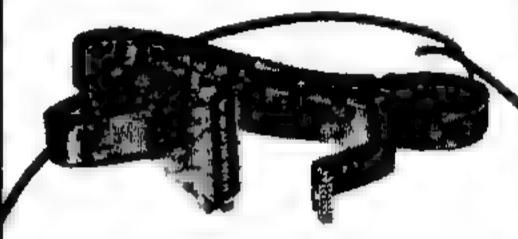
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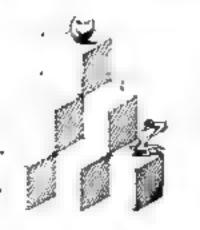
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# Success Formula . . . from p. 33

beginning, and you will be forced to rely on chance until you acquire experience. As the game nears its completion, you will be making more decisions, but sometimes, as in real life, you will still have to take a chance and live with the outcome. The game can be won or lost right up to the final turn.

As with an adventure game, it is more fun to play the game cold—learning as you go and building on what you've learned. But a few things should be noted.

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Think of your potential experience as a stack of randomly shuffled cards each numbered 1, 2 or 3. You will be given the opportunity to draw "cards" from the stack at various times during the game. An experience "card" gives you the option of

advancing 1, 2, or 3 squares on the gameboards instead of taking a chance. You trade in your cards as you use them and you are allowed to hold only five cards of each value at any time during the game. You will be given an experience value of zero if you draw a sixth card of the same value as any of the five you are currently holding. You may receive experience as a result of landing on the first three squares in any sideboard, and for successfully completing any of the five occupation sideboards. You will also get a card for the "experience" of going to court or being drafted into the army.

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1300 1370	Routine to display	5770-5820	Routine to read the
	message on the screen without scrolling.		DATA and assign it to the array B.
1380-1610	Routine to display the rolling of the dice.	5830-5870	DATA for array B to control the sideboards.
1620-1780	Payday routine.	5880	END of the program.



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The Program

This program pushes the resident RAM of the TI-99/4A to its limits and, of necessity, is actually a combination of two programs. The main program contains all of the game logic; the Supplemental Data program contains the string data necessary to play the game. The data is INPUT as a data file into the main program each time. the game is played.

The main program should be SAVEd on tape, then the Supplemental Data program. should be RUN and the data file recorded on the tape at a spot just after the main program. Then, when the main program. is loaded into the computer memory, the data file is ready to be INPUT as soon as the main program is RUN. Also, be sure that the [ALPHA LOCK] key is depressed. on the TI 99/4A.

If you have a disk controller and disk drive attached, you must use CALL FILES(1) before running this program.

	•
REM BY BUD DAVIS	
REM 99'ER VERSION 2.10.1	
CALL CLEAR	
CALL SCREEN(15)	
MS="SUCCESS FORMULA"	
60SUB 1310	
DETION BASE 1	
DIM St (21), B (25), E (3), Et. (6, 10)	•
E\$ (5)	
CALL CHAR (100, "002277777F3E1C	•
8")	
CALL CHAR (105, *08087F3E1C36224	ł
H II III III II III III III II II II II	

242 READ AS 250 CALL CHAR (C, A+) 260 NEXT C 270 FOR C=9 TO 11 290 READ X.Y |記字側||CALL COLOR(C,X,Y) BOOM NEXT C 310 DATA 000000101,0000200000004,00 1004000100002 320 DATA 000044000044.004400100044 ,005400000054,7,1,16,1,2,16 高速的 CALL CLEAR 540 PRINT "IMPUT DATA": : 高声の OPEN #1:"CS1",INTERNAL,INPUT , F1XED 192 SAN FOR SANE TO 6 [5] # INPUT #1:B\*(S,NE),B\*(S,0),B\*(S 。3),B\$(S,4),B\$(S,5),B\$(S,6),B\$ (S,7),B\$(S,8),B\$(S,9),E\$(S,10) 3390 NEXT S 選学の注INPUT #1:Eキ(NE)。Eキ(色)。Eキ(3)。E注 (4),E\$(5),S\$(NE),S\$(0),S\$(3),S \$(4),S\$(5),S\$(6),S\$(7),G\$(8),S \$ (9),S\$ (10) #00 INPUT #1:S\*(11),S\*(12),5\*(13), S\$(14),S\$(15),S\$(16),S\$(17),S\$ (16),S\$(19),S\$(20),S\$(21) 410 CLOSE #1 420 CALL CLEAR 脚窓の『MSS! MENEY POINTS(\$/1000) " #40 Hs=" HAPPINESS POINTS " #50 F\$=" FAME POINTS " HAR PRINT "YOUR 18, AND HAVE": "GRA DUATED FROM HIGH SCHOOL.": : : 470 IF M>0 THEN 690 **480** 609UB 720 ### PRINT : : "ENTER YOUR SUIDDESS F ORMULA.": :"TOTAL POINTS MUST= 1000.": : MOON INPUT MS: G 着10 INPUT H4:HP 質量を INPUT F4:FP **当38** IF Q+HP+FP<>1000 THEN 490 **当時間 日=日本1000** 西門歌川村本二"本 "&STR牛(Q) "&STR\$ (HP) %H\$ 560 H4= 576 FS=" "&STR\$ (FP) &F\$ **海田寺** 『CALL CLEAR 596 A4-"" 605UB 730 410 L=18 AZO N=NE **630** H=5 **640** A=5000 A=A M=A 440 IS=0 676 FRINT::::

**680** 6010 460

700 GOSUB 5740

占字数 FRINT "PRESS ANY KEY"

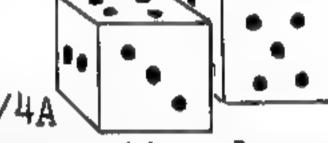
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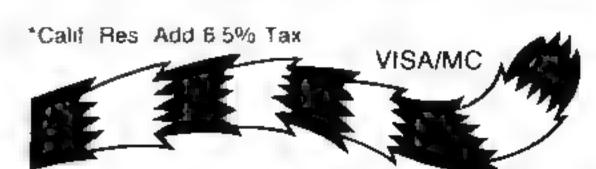


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Continued on p. 46

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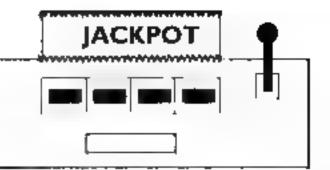
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GDSUB 1100

60TO 1790

CALL SCREEN (15)

TUCSON, AZ 85740

# Success Formula . . . from p. 45

ESCHERINT "TO WIN YOU MUST GET AND KEEP: ": : A\$; M\$: : A\$; H\$: : A\$; F

740 PRINT : "BY THE TIME YOU ARE": " 40 YEARS OLD."

750 RETURN

TAG CALL CLEAR

774 IF G>10 THEN 790

788 DN 5 50TO 4620,4650,4710,4860, 850,4900,830,4940,820,5090

790 ON 6-10 GOTO 810,5170,860,5210 ,5290,5360,800,5460,840,5530,1 620

800 S=S+NE

810 9=S+NE

1920 S=S+NE

830 S=S+NE 840 S=S+NE

850 S=S+NE

BAO RETURN 970 CALL CLEAR

ELECTRICALL SCREEN(11)

870 R=15

900 MS="OPPORTUNITY KNOCKS"

**製ま**動物GOSUB 1320

920 PRINT "MAY GO TO:": :

#36 FOR X=5 TO 19 STEP @

940 IF X=13 THEN 980

954 IF X>9 THEN 970 960 FRINT " ":

PRINT X:5\*(X)

PEG NEXT X

990 FRINT : :

1000 INFUT "ENTER NUMBER ": 5 1010 FOR X=5 TO 19 STEP @

1620 IF 6=X THEN 1050

1**846** 60TO 1000

MEXT X

1950 CALL SCREEN (15)

1060 S=0

1070 60SUB 760

1080 IF S=0 THEN 1790

1070 GOTO 2140

INT (CONTACT) THE

1110 IF E(X)=5 THEN 1140

1130 60TO 1150

1140 X=0

150 PRINT "EXPERIENCE=";X

LEGO RETURN ILINO CALL CLEAR

1180 CALL SCREEN(12)

#190 PRINT "\* TELEGRAM \*" #200 PRINT : : "DRAFT NOTICE" :: :,

"UNCLE SAM": : :

PRINT "2 YEARS IN ARMY" : : "CD LLEGE PAID.": : :

1220 L-L+@

FOR DENE TO 300 LZBW NEXT D 12整数 RETURN 1388 M\$=5\$ (G) 1510 F=12 ||古歌像 || C=INT((32-LEN(M#))/@) 15#M D=ASC (SEG# (M#, I, NE)) は体験側(CALL HCHAR (R, C+I, D)) I STO RETURN PRINT : "PRESS ANY KEY" **世域外側 150508 5740** FANDOMIZE WIND D=INT(6\*END)+NE ■構造機 F'= INIT (A\*RND) +NE. 430 DD=D+P ### ON 9 GOTO 1520,1480,1450 TO YES 1440 C=7 1450 GOSUP (1570) 1480 Y=0 1490 C=5 1500 GOSUB 1570 15kg FRINT | 数20 | IF |(DD=7)+(DD=11)+(D=P) THEN 15 1550 X=0 1540 RETURN Manage X = 小E 地震影響 RETURN 加速に関い FOR I=112 TO 117 TENDE CALL HOHAR (24, C. I) MEXT I, 1600 CALL HCHAR (24, C, 111+Y) MALIN RETURN 1620 M=M+A 1636 R=10 ### M#="DOUBLE" 1550 GDSU9 1320 MS="PAYDAY" | 6 | CALL SOUND (240, 372, 0) (360,523,8) | CALL SOUND (120,392,0) #700 CALL SOUND (360,494,0) 121 M CALL SOUND (120, 523, 8) は機能 LEL+NE B(NE)=0 **講義劇 GDSUB 127**9 THE CALL CLEAR I TOO RETURN 605UB 1270 BOO CALL CLEAR BEND B (NE) HB (NE) HNE MB2数 IF B(NE) < 5: THEN 1840

1650 160SUB 1660

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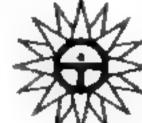
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# Success Formula

```
MAMM PRINT TAB(8); "CAREER RESUME": T
      AB(21); "AGE: "; L; "SALARY: $"; A:
      "EDUCATION: ";E#(N)
 PRINT :"
                    CASH-ON-HAND: $"; M:
      TAB(B); "MAPPINESS: ;"(H: TAB(13) ||
      , "FAME: ";F
 INDER DENDE: "EXPERIENCE: "
 INDIAN FOR I=5 TO 19 STEP @
IF B(I)=0 THEN: 1900

FRINT B(I):S$(I)

FRINT I

FRINT : "YOUR OBJECTIVES:":" $
  "; G: " "; H$; " "; F$.
 開開開催 IF B(NE) = P THEN 5880
 | MIN IF (MCG) + (HCHP) + (FCFP) THEN 207
 100 GOSUB 1270
CALL CLEAR

LEGO MS="A WINNER!"

FOR C=10 TC 22
CALL SOUND (-99, 1047, 8)
2010 CALL HCHAR (11, C, 36)

2010 CALL HCHAR (13, C, 100)

2020 CALL SOUND (-99, 2885, 5)

2010 CALL HCHAR (14, C, 105)
NEXT C
開始機 GOTO 184⊘
 2070 IF L>40 THEN 5630
16 MC-20000 THEN 5600
2070 D=NE
2100 GUSUB 1380
#### IF (B(@)=NE)+(L)(30) THEN 2130
| IF (DD=0) + (DD=12) THEN 1,179
# IF (DD=7)+(DD=11)THEN 870
MINIMA IF SHO THEN 2160
MANDER PRINT : "ENTER": " (5 $ (6): "DR
MUMBE PRINT : "YOU HAVE THESE OPTIONS
Man FIOR X=NE TO 3
2190 IF E(X)=0 THEN 2230
2200 IF G+XK=21 THEN 2220
                "; S$ (G+X-Y)
2220 FRINT *
ZZMO FRINT "
                 CHANCE": :
 MANUTE S=0 THEN 2280
270 IF M==S4 (G) THEN 2420
深端曲側 [JF] MS=|"CHANCE" THEN 2500
 TO 3
Y-O
2500 IF G+X<=21 THEN 2330
Y-21
```

### IF MS=S\$ (G+X-Y) THEN 2360

NEXT X

60TO 2250

```
製造数!IF E(X)=0 THEN 2250
記さず難能E(X)=E(X)-NE
2380 IF 6+X>21 THEN 2410
2390 G=G+X
2420 GOTU 2420
2410 G-G+X-21
2420 S-0
2430 GOSUB 760
2446 IF S=0 THEN 2570
2450 IF B(G)=3 THEN 2620
2440 K=N
2470 MS="ENTER "&S$ (G)
2489 GOSUB 1310
2070 ON S GOTO 2650,2950,3010,3070,
     3120,3190
2500 D=NE
2510 60SUB 1400
2540 IF G+DD<=21 THEN 2540
2530 6=G-21
2540 6=G+DD
2550 S=0
2566 GOSUB 760
閲覧記載 (IF G<21 THEN 1790)
2580 G=0
2570 GOTU 1790
2600 GOSUB 4560
2610 PRINT : "NOT ENOUGH CASH-ON-HAN
2620 PRINT : "YOU CAN'T ENTER."
2630 5=0
2640 GDTD 1790
2650 IF N>3 THEN 2620
2660 IF B(@) = 0 THEN 2690
2676 PRINT "VETERAN-TUITION PAID"
2680 GOTO 2720
2470 PRINT "TUITION= $ 5000"
2700 IF M<5000 THEN 2610
2710 M=M-5000
2720 IF NONE THEN 2000
2730 FRINT : :NE:
2740 PRINT Es(@);" IN:": :"
    NITIES":"
                  SOCIAL SCIENCES":
2750 IF N>NE THEN 2850
2740 FRINT E;
2770 FRINT E#(3);" IN:": :"
                               SCIE
     NCE": "
               ENGINEERIN5": : : :
2780 IF N>NE THEN 2850
京プラの INPUT "ENTER 1 OR 2 ":X
製田のの || IF (X<>NE) * (X<>@) THEN 2790
12910 N=X+NE
2820 CALL CLEAR
2830 IF N=@ THEN 2740
2840 IF N=3 THEN 2770
PRINT : "4 YEARS --- NO SALARY"
2850 L=L+4
2870 | ISDTD 2920
12日日日 N=N+0
```

記憶90 FRIN1 : "2 YEARS---RECEIVE SALAR

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# Success Formula . . . from p. 47

2910 L=L+0 2910 M=M+A+A 2920 RESTORE 32767 2930 GOSUB 5770

2940 GOTO 3340 2950 X=30000 2960 RESTORE 5830

2970 GDSUB 5770 2980 IF N=3 THEN 3340

2990 IF N=5 THEN 3330

3000 GDTD 3280 3018 X=5000

3020 RESTORE 5840 3030 GOSUB 5770

3040 IF N=NE THEN 3060

3050 K=0 3060 G01D 3290

3080 RESTORE 5850

3090 605UB 5770 3100 IF N>NE THEN 3330

3110 GOTD 3280 3120 X=30000

3130 RESTORE 5860 3140 60SUB 5770

3150 IF N=4 THEN 3330 3160 GOTD 3280

3170 K=B(13)+NE 3180 GOTD 3290

3190 IF L<36 THEN 3220

3200 PRINT : "YOU" RE OVER 35. " 3210 GOTD 2620

3220 X=40000

3230 RESTORE 5870 3240 GOSUD 5770

3250 IF B(17) (@ THEN 3270

3240 K=3 3270 IF N>NE THEN 3340

3290 IF B(G)>0 THEN 3340 3290 FRINT "PAY \$";X

3340 IF MKX THEN 2600 3310 M=M-X 3320 GOTO 3340

3330 K≂@

3340 J=0 3350 FRIND : "POINTS AND MONEY X"; K 3340 GOSUB 1270

3370 CALL CLEAR 3380 PRINT "EXPERIENCE OPTIONS: ": :

3390 FOR X=NE TO 3 3400 IF (E(X)=0)+(J+X>10)THEN 3460 3410 M4=84(S,J+X)

3420 IF LEN(M\$)<26 THEN 3450 3430 PRINT X: SEG\$ (M\$, NE, 25): SEG\$ (M\$

3440 60TD 3460

3450 PRINT X;M\$
3460 NEXT X

3450 NEXT X 3470 FRINT : "OR": : "4 TAKE A CHANCE

198 Ms=""

INPUT "ENTER NUMBER ":X 家態勝樹。X=INT(X) IF (X<NE)+(X>4) THEN 3490 透路整体 IF X=4 THEN 3570 鷹鷹藤樹 IF (E(X)≔ゆ)+(SB+X>1の)THEN 349 本語の例 J=J+X **選覧機関 (601)0 3600** 3570 D=NE 3580 609UB 1400 3590 J=J+□ 3600 CALL CLEAR 3616 IF J>10 THEN 4460 **3830, 3830, 3830, 3830, 421** 3870, 3870, 3910, 3910, 4270, 4450 SAME IF WED THEN 3680 SASS CALL HCHAR(14, 3, 100, U) 3660 H=H+U 3576 U-0 SABB IF V=0 THEN 3720 56 DALL HCHAR (19, 3, 105, V) STOO F=F+V 3710 V=0 . IF WHO THEN 3740 部部部を | FRINT "申"。| W TOWN WED BITTO THEN 3360 KYBO FOR Y-NE TO T 3776 GOSUB 1100 SBOO NEXT Y 3620 GOTO 3360 BBS6 T=K#INT (3#RND) 「西山市 (|K\*INT(9\*RND)) #BS® V=V+(K|\*INT(タ#RND)) 3860 GOTO 3640 **8日76** U=K本INT (11 \*RND) \*B (4) **3日日の** | V=K\*INT (11\*RND)\*B(1例) 3870 W=K\*1000\*B(16) **3790** 6010 3840 3日1日 (46) 3920 V=K\*B(12) 5930 N=K\*1000\*B(1B)

394歳 IF J=7 THEN 3970

3969 GDTO 3840

3780 GOTO 3840

4000 F=INT(F/0)

4040 GDTD 3640

60TO 3640

4016 U=0

4020 V=0

4050 H=0

IF 8 (23) >0 THEN 4150

4030 MISE LOSE HALF. YOUR FAME"

#650 MISE LOSE ALL HAPPINESS"

3990 ON B (22) GOTO 4000, 4050, 4080,4

第9字章 IF B(22) >0 THEN 3990

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#### Success Formula

```
MINE MALL CASH!"
4110 GOTO 3640
MINIO A=A+ (5000 KK)
MINION MINION INCREASE SALARY $"&STR$ (50)
    @@#K3
### GOTU 3640
Made INT (A/Pe).
MINIMIN MISH" SALARY REDUCED!"
機能機能 GDTU 3640
60SUB 1380
#### U=K|*O*E-(8)
```

```
#258 W=K*O*1000*B(20)
4266 GOTO 3640
4270 IF S<>NE THEN 4290
4288 IF (B(17)=3)+(L>35) THEN 4460
4270 IF KK3 THEN 4310
浄398|||ほ(17)=3
4310 GOSLIB 4560
4550 IF G=17 THEN 4360
4340 GDSUB 760
4350 GOTO 1790
4360 B(25)=15
4379 6DSUB 4410
4.580 S=6
4390 CALL CLEAR
4400 GOTO 2470
本男1巻 A=A+(B(25) *1000水K)
##20 FRINT "NEW SALARY= $" A: :
```

438 GDSUB 1270

```
4448 RETURN
4450 GDSUB 4410
#46# FRINT : "EXIT ": 55 (G): :
#470 IF SINE THEN 4500
4480 GDSUB 4410
4490 GOTO 4540
4500 B(G) =B(G) +NE
#SIN FOR Y=NE TO B(6)
4526 6DSUB 1100
#530 NEXT Y
4540 GDSUB 4560
4550 GDTO 1790
4546 FOR X=4 TO 22 STEP @
4576 B(X)=0
4智目の NEXT X
4590 B(23) =0
4600 S=0
MAIN RETURN
4626 GOSUB 1300
#636 Z=INT (A* (A/30000))
4440 GOTO 5050
#650 MS="BUY A "&55 (G)
4660 GOSUB 1310
#478 X=INT (A/1000)
4680 Y=0
4690 Z=A
4700 GOTO 4990
GDSUB 1300
KYZW PRINT "YOU ARE SUED FOR LIBEL"
ATTO DENE
展示系数 GDSUB 1380
4750 IF X-NE THEN 4830
#766 PRINT : "GUILTY!"
ATTO IF MK=0 THEN 4800
ATOM Z=INT(M/E)
FIFE GOSUB 5050
HERON PRINT : "LOSE 1/2 YOUR FAME": 1
#818 F=INT(F/8)
4820 GOTO 4840
HECKE PRINT: : "NOT GUILTY--"E : E
4840 GOSUB 1100
ANDEN RETURN
4848 GDSUB 1300
神像方向 L=L+NE
HOSE 1 YEAR'S TIME & GA
    LARY"
AND RETURN
4900 GDSUB 1300
#學生的 PRINT "LOSE 25% OF YOUR CASH"
#P26 M=M-INT (M/4)
#436 RETURN
海中本の MS="INVEST IN A HOBBY"
海学性の 605UB 1310
海型高級 X=INT ( (A/1000) *RND)
条型字形 Y=X
専事務の Z=A-(X 41000)
# 4 THEN 5020
脚準計劃 [CALL HCHAR (1)4, 3, 1)00, 以)
BOSS IF Y=0 THEN 5050
SOJO FEFTY
5040 CALL HOHAR (18, 3, 105, Y)
Sets M-M-Z
BOOK FRINT : "FAY 5"; Z
3070 GOSUB 1270
5000 RETURN
3070 605UB 1300
間は ● IF M>0 THEN 5130
5110 Z=0
5050 5050
数130 D=3!
新事業 GOSUB 1380
製地製御 【Z=X×INT(M/D)
5160 GOTO 5050
製造開始 Ms="RENT IS DUE"
数1数数 GDSUB 1310
Sin で Z⊨INT (A/E)
5200 GOTO 5050
5210 GOSUB 1300
音型記録 IF M>の THEN 5250
FRINT "FORGET ITT"
5240 RETURN
5250 D=0
5260 GOSUB 1380
哲文学的『Z=INT(。1.4M*①)
高型自動 | GOTTO | 5050
言葉中の MS=5本(G) R:"AN HOL IDAY"
監察機 GOSLIB 1310.
5310 X=INT(30*RND)+10
5320 Y=0
12-0 ·
```

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# Success Formula . . . from p. 49

STAR FRINT "TRIP TO THE ISLANDS!": 5350 GOTO 5000

5340 GOSUB 1300

BETO IF MA THEN 5440

5380 D=3 5390: 50SUB 1380

古典的() Z=(X\*5\*A) -A

部本主体 M=M+Z

5420 FRINT "\$"; Z 5430 IF Z>0 THEN 5450

5446 FRINT : "SORRY"

5450 RETURN

5468 GOSUE 1300

5440 THEN 5440

5466 X=24

5490 Y=4

5500 Z=20000

SSID PRINT "WEEKEND TO REMEMBER!"

**3528** 6010 5000

5556 GOSUB 1300

5540 IF M>0 THEN 5560

MESSE PRINT "THANKS, ANYWAY."

5560 (Z=INT(.1\*M)

5578 Y=4

新野田町 X=INT (Z/1900)+4

5590 GOTO 4990

SADO CALL CLEAR SAIN PRINT "DECLARE BANKRUFTSY"

5620 60TO 5650

BASO CALL CLEAR

SAME PRINT "YOU ARE "; L; "AND HAVEN'T ": "REACHED YOUR OBJECTIVES."

5650 GUSUB 1270

S640 CALL CLEAR

あるする「MS="YOU LOSE"

**5680** GDSUB 1310

5699 X=14080

STAR CALL SOUND (-99, X, E) 为大业战 X—X/已

■200 IF X=55 THEN 2050

5730 60TU 5700

BOWNER CALL KEY (0, R, ST) ST=0 THEN 5740

STAR RETURN

5776 READ B1

5786 FOR B2=NE TO B1

5790 READ B3. B4

5866 B(B3)=B4

5819 NEXT B2

BBZ# RETURN

583% DATA 7,4,1,6,12,8,6,10,1,12,12

,24,17,25,5 5640 DATA 7,4,1,16,5,20,3,22,4,23,1

,24,10,25,3 BB50 DATA 7,4,1,6,8,8,1,14,1,20,1,2

4,4,25,2 5860 DATA 7,6,5,12,10,14,4,16,10,22 1,1,24,10,25,5

MINE DATA 7,4,1,12,10,16,5,18,-5,2 , 10, 24, 4, 25, 7

Success Formula Supplemental Data Program Explanation of the Program

Line Nos.

Program header. 100-190 Dimension arrays, read 200-330 DATA into arrays from DATA statements.

Output DATA to the 340-400 cassette tape.

Supplemental DATA for 410-570 the main program Suc-

cess Formula.

其**的**原:REM 米米米米米米米米米米米米米米米 PIN REM \*SUCCESS FORMULA\*

NEW REM \* REM \* SUPPLEMENTAL

THO REM \* DATA PROGRAM **电影的 医巨洲 米米米米米米米米米米米米米米米** 

LEG REM BY BUD DAVIS 170 REM 99'ER VERSION 2.10.1

MAN REM THE REM

MON CALL CLEAR

PRINT "RECORD DATA ON TAPE FOR INPUT TO SUCCESS FORMULA

PROGRAM. ": : : : DIM B\$ (6, 19), E\$ (5), S\$ (21)

DUNNETOR S=1 TO 6 THE FOR SEEL TO 10 DEM READ BS (S. SE)

MEXT SB TO NEXT S

FOR EP=1 TO 5 READ ES (EF)

THE NEXT EP 310 FOR SQ=1 TO 21

READ SA (SD) MEXT SD

MARGOPEN #1: "CS1", INTERNAL, DUTPUT WEIXED 192

3), B\$ (S.4), B\$ (S,5), B\$ (S.6), B 5,7), B\$ (S.B), B\$ (5,7), B\$ (S, 10)

NEXT S 等原数 FRINI #1:E\$(1),E\$(2),E\$(3),E 4),E\$(5),5\$(1),5\$(2),5\$(3),6

4),5\$(5),5\$(6),5\$(7),5\$(8),**以** (9),5\$(10)

Continued on p

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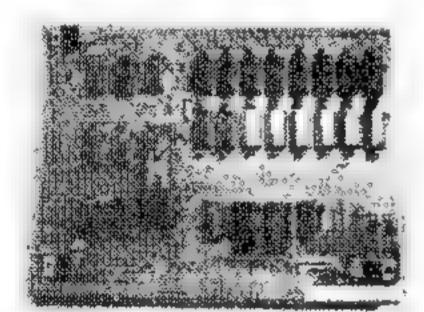
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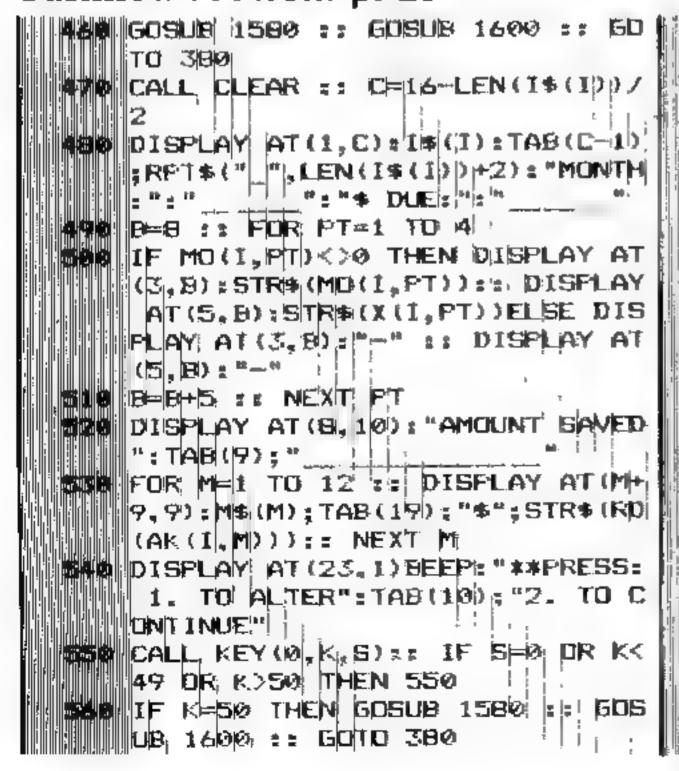


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Cashflow . . . from p. 26



ч н	100	
		AT (3, B) SIZE (-2) VALIDATE (DIGIT
1		"-") BEEP: MO\$ (I, PT)
į	200	IF MOS(I,PT)="-" THEN MO(I,PT)
ŀ		=0 ELSE MO(1,PT)=VAL(MO\$(1,PT)
F		)
	418	IF MO(I,PT)<0 OR MO(I,PT)>12 T
		HEN 590 ELSE IF MD\$(I,PT)="-"
i		THEN 640
	620	ACCEPT AT (5, B) SIZE (-4) VAL 1DATE
		(DIGIT, "-") BEEP: X\$(I,PT):: IF
. ·  -	1 1 1 1 1 1 1	X\$(I,PT)="-" THEN X(I,FT)=0 EL
1		SE X(I,PT) = VAL(X\$(I,PT))
l	630	IF VAL (X\$(I,PT)) (0 THEN 620 EL
		SE BER45 :: NEXT PT
	440	FOR M=1 TO 12 :: ACCEPT AT (M+9
E		, 20) SIZE (~5) VALIDATE (DIGIT) BEE
ĺ	THE PERSON NAMED IN	P:AK(I,M):: NEXT M
	·IF II IF II IF I	GOTO 540
		! ENTER NEW ITEMS
	670	609UB 980 :: 60SUB 1580 :: 60S
		UB 1600 :: GUTO 380
Ш		

	MBER OF THE ITEM": "YOU WANT TO DELETE. IF YOUR": "DELETIONS A
1ORY CARD	RE COMPLETE, ": "PRESS '0': 0"  700 ACCEPT AT(24,12)SIZE(-2)VALIDA  TE(DIGIT)BEEF: I :: IF I=0 THEN  720 ELSE IF I(1 DR I)A THEN 6
temory Card in volume, and ve been calling to praise our	90 ELSE [1\$(1)=""  710 FOR M=1 TO 12 :: AK(I,M)=0 ::  NEXT M :: FOR FT=1 TO 4 :: MO( 1,FT),X(I,PT)=0 :: NEXT FT  720 GOSUB 1580 :: GOSUB 1600 :: GO
nd need more memory <b>or</b> if e memory programs our <b>128K</b> you.	TO 380  TO 380  TO 380  CHANGES COMPLETED  740 GOSUB 1570 : GOSUB 1220 :: GO  TO 300  750 DISPLAY ACCOUNTS
design by our MIT-trained	PAR DATA TOTAL," -SAVINGS"," -EXPENSES", PAY SAVINGS  770 RESTORE 760 : FOR B=13 TO 16 :: READ M4(B): NEXT B  780 FOR I=1 TO 16 :: U(I)=0 :: NEX
n top manufacturers lugs into your Peripheral	790 GDSUB 1480 :: C=1 :: GDSUB 159  20  EAC CALL HCHAR(20,3,75,29):: FOR B =21 TO 24 :: DISFLAY AT(B,1):M
Card run the same programs Pascal, Extended Basic, and	# (B-B):: NEXT B    Bis Display at (1,1): "MONTH? 1 ('0)   '=BACK TO MENU)" :: DISPLAY AT (2,9): RPT*(" ",10)   RES ACCEPT AT (1,B) SIZE (-2) VALIDATE (DIGIT) BEEF: M :: IF MKO OR M>1
ne call will reserve a card for	2 THEN 810 BE IF M=0 THEN 300 BE DISPLAY A T(1,1):RFT*(" ",53):: DISPLAY AT(1,C):M*(M):TAB(C-1);RFT*("_ ",LEN(M*(M))+2)
ediate delivery.  ow you have a choice*  e 32K Memory Card at \$150	E #1, REC M*2-1  E #1, REC M*2-1  HEN FOR I=1 TO A :: IF U(M) =1 THEN  870 ELSE INPUT #1: AK(I, M),  DISPLAY AT(I+2, 16): USING 200: A
e 128K Memory Card at \$220	K(I,M):: NEXT I  BEO IF U(M)=1 THEN B90 ELSE INFUT  #1:T(M),SA(M),EX(M),F(M),NF(M)  BYO DISPLAY AT(21,16):USING 200:T(  M):: DISPLAY AT(22,16):USING 2
	#20 DISPLAY AT (23, 16): USING 200: EX (M):: DISPLAY AT (24, 16): USING 200: P(M) 200: P(M) = 0 THEN U(M) = 1 :: GDTD
	960 920 FOR B=1 TO NP(M) 930 IF U(M)=1 THEN 940 ELSE INFUT #1:IT(B,M),X(B,M), 940 DISPLAY AT(IT(E,M)+2,22):"(-"&
– Order Now! TION Iron, CA 94920	STK#(X(B,M))&")"  958 NEXT B :: U(M) = 1  968 CALL KEY(0,K,S):: IF S=0 THEN  960 :: GOTO 810  978 '. INPUT SUBROUTINE
-3840	POR A=A+1 TO 16  POR DISPLAY AT(10,1) ERASE ALL: "ENT ER NAME OF ITEM "; STR\$ (A); ".": :"IF ALL ITEMS ARE COMPLETE," : :"PRESS ENTER:"
IF I*(I)="" THEN C=C-1 500 ACCEPT AT(1,C)SIZE(-14)VALIDAT E(UALPHA,":-")BEEP:I*(I) 500 B=8 :: FOR PT=1 TO 4 :: ACCEPT	TE (UALPHA, "~" ") BEEP: I* (A) :: IF  I* (A) == "" THEN A=A-1 :: RETURN  1010 DISPLAY AT (10, 1) ERASE ALL: "HOW  MANY TIMES PER YEAR WILL": "
AT (3, B) \$1ZE (-2) VALIDATE (D) [GIT , "-") BEEP: MO\$ (I, PT)  500 IF MO\$ (I, PT) = "-" THEN MO(I, PT)  =0 ELSE MO(I, PT) = VAL (MO\$ (I, PT)  )	MONEY BE DUE ON THIS ITEM?": : "(0~4): 1"  1020 ACCEPT AT (14,8) SIZE (-1) VALIDAT E(DIGIT) BEEP: PT :: IF FT<0 DR PT>4 THEN 1020 ELSE IF PT=0 TH EN 1130
### 15 MO(I,PT) ### 15 MO(I,PT) ### 15 MO(I,PT) ### 15 MO(I,PT) #### 15 MO(I,PT) ####################################	1050 DISPLAY AT (6, 1) ERASE ALL: "FOR EACH PAYMENT, ENTER THE": : "NU MBER OF THE MONTH THE": : "PAYMENT IS DUE, AND THE": : "AMOUNT TO BE PAID."
X\$(I,PT) ="-" THEN X(I,PT) = 0 EL  SE X(I,PT) = VAL(X\$(I,PT))  430 IF VAL(X\$(I,PT)) < 0 THEN 620 EL  SE B=B+5 :: NEXT PT  440 FOR M=1 TO 12 :: ACCEPT AT(M+9  , 20) SIZE(~5) VALIDATE (DIGIT) BEE	1048 DISPLAY AT(15,3): "MONTH"; TAB(1 7); "AMOUNT": TAB(3); ""; TAB (17); ""  1058 FOR E=1 TO PT :: ACCEPT AT(B+1 6.5) VALIDATE(D161T) BEEF: MO(A, B)
P:AK(I,M):: NEXT M 650 GOTO 540 640 ! ENTER NEW ITEMS 670 GOSUB 980 :: GOSUB 1580 :: GOS	):: IF MD(A, B) < 1 DR MO(A, B) > 12 THEN 1050 LESS DISPLAY AT (B+16, 17): "\$" :: ACC EPT AT (B+16, 18) SIZE (4) VALIDATE (DIGIT) BEEF: X (A, B) :: IF X (A, B)
SEC DELETE ITEMS 99'er Home Con	Continued on p 54 nputer Magazine August 1983 51

關聯 DISPLAY AT(21,1):"ENTER THE NU



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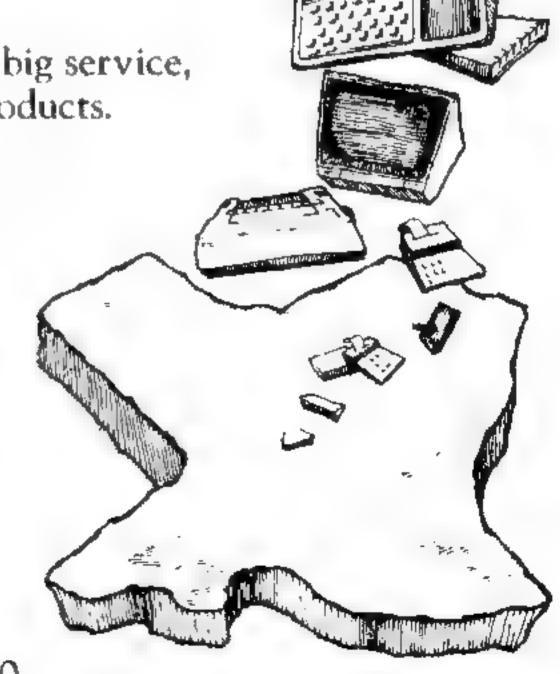
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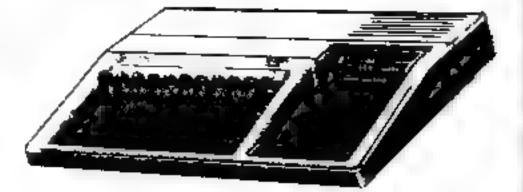
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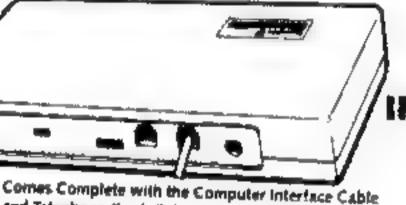
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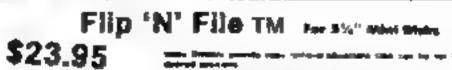
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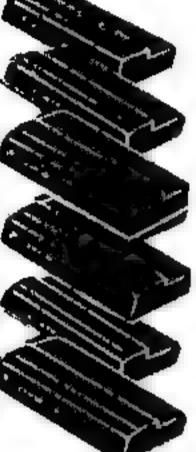
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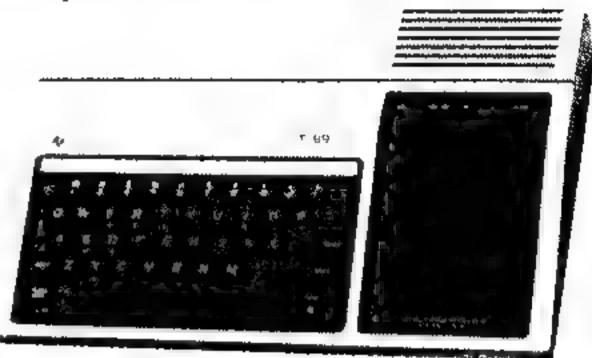
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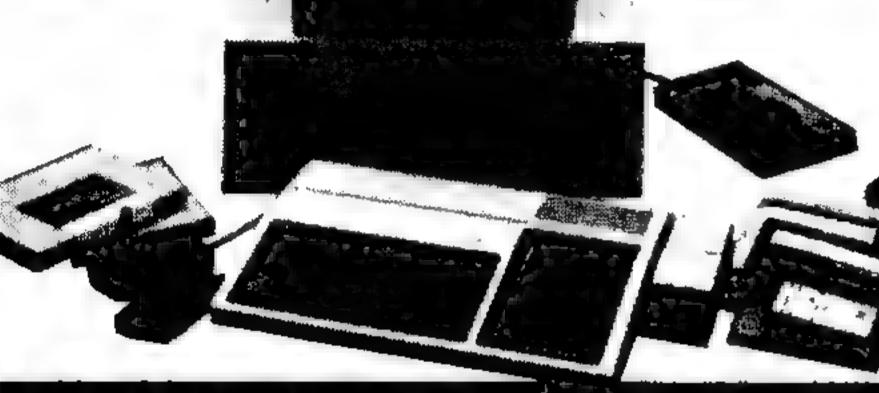
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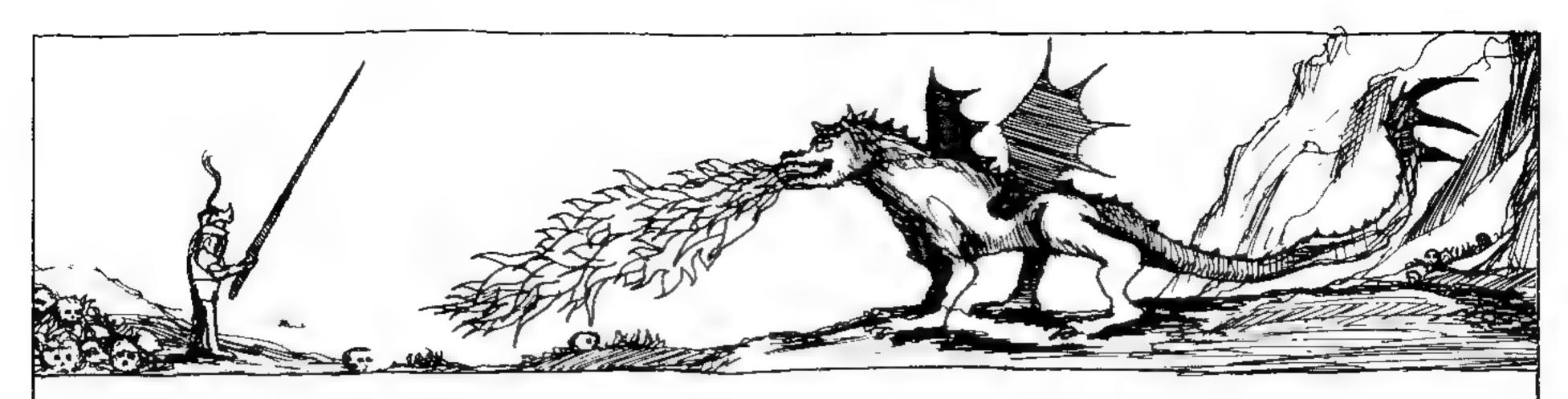
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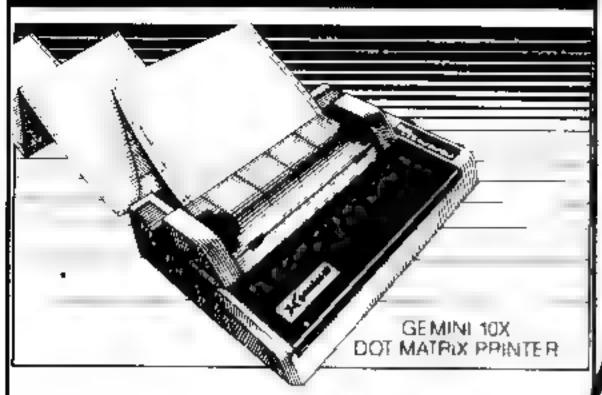
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970 NEXT B

I OR DISPLAY AT (10,1) ERASE ALL: "DO YOU WANT TO RESERVE AN": : "EQUI AL AMOUNT EACH MONTH": : "TOWAR: D THIS BILL? (Y/N) Y"

1090 ACCEPT AT(14,26)SIZE(-1)VALIDA TE("YN")EEEP:A\* :: IF A\*="N" T HEN 1130

1 100 FOR B=1 TO 12 :: AK(A,B)=0 ::

110 FOR E=1 TO PT :: M=MO(A, B);; A K(A, M) =AK(A, M) + X(A, B) :: FOR C= 1 TO 11 :: M=M+1 :: TF M=13 TH EN M=1

1120 AK(A,M)=AK(A,M)+X(A,B)/12\*C :: NEXT C :: NEXT B :: GOTQ 1150

1134 DISPLAY AT (2,1) ERASE ALL: FOR EACH MONTH, ENTER THE": : "AMOUNT NT YOU WISH TO HAVE": : "ACCUMU LATED TOWARD THIS": : "ITEM:"

1140 FOR M=1 TO 12 :: DISPLAY AT (M+
9,3):M\$(M);TAB(15);"\$" :: ACCE
FT AT (M+9,16)SIZE(6) VALIDATE(D
IGIT, ".") BEEP: AK(A,M):: NEXT M

1150 NEXT A :: IF A=17 THEN A=16 ::
DISPLAY AT(12,10) ERASE ALL: "F
ILES FILLED" :: FOR C=1 TO 400
:: NEXT C :: RETURN

1160 DISPLAY AT(7,1) ERASE ALL: ENTE R THE NUMBER": : "OF THE PRESEN T": : "MONTH (1-12):"; TAB(21);"

1170 ACCEPT AT(11,21)SIZE(-2)MALIDA TE(DIGIT) BEEP:PM :: IF PMK1 UR PM>12 THEN 1160

1180 DISPLAY AT (15,1): "ENTER THE AN OUNT": : "YOU HAVE ALREADY": : "
SAVED. IF ANY: "; TAB (20); "\$0"

1190 ACCEPT AT (19, 21) SIZE (-7) VALIDA TE (DIGIT, ".") BEEP: SA (PM):: IF SA (PM) <0 THEN 1190

1206 SAV=SA (PM) : 2 RETURN

1210 TOTAL ACCOUNTS

1220 FOR M=1 TO 12 :: T(M), EX(M), NP (M)=0 :: FOR I=1 TO A :: T(M)=: T(M)+AK(I,M)

1230 FOR PT=1 TO 4 :: IF MO(I,PT)=M
THEN NP(M)=NP(M)+1 :: EX(M)=E
X(M)+X(I.PT)

1240 NEXT PT :: NEXT I :: NEXT M

1250 M=FM -1 :: FOR B=1 TO 12 :: M=M +1 :: IF M=13 THEN M=1

# 260 P(M) =T(M) ~SA(M) -EX(M)

1270 IF B=12 THEN 1280 ELSE IF MK>1 2 THEN SA(M+1)=SA(M)+P(M)ELSE SA(1)=SA(12)+P(12)

1286 NEXT B

1270 DEL=0 :: FOR I=1 TO A :: IF I\$
(I)="" THEN DEL=DEL+1

1300 MEXT I

1314 PRINT DATA FILE

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| S20 PRINT #1, REC 0:A-DEL, 3: FOR 1= 1 TO A :: IF '1\*(I) <>"" THEN FR INT #1:I\*(I),

1330 NEXT I

1340 M=1 :: FOR R=1 TO 23 STEP 2 ::

RESTORE #1,REC R :: FOR I=1 T

O A :: IF I\$(I)K>"" THEN PRINT

#1:RD(AK(I,M)),

1350 NEXT I

1368 FRINT #18RD(T(MD), RD(SA(MD), RD (EX(MD), RD(P(MD), NP(M)

(I)="" THEN DELEDEL+1 :: GOTD

THEN PRINT #1:I-DEL, X(I, PT), MAXIMUM OF 14 PAYMENTS IN ONE MONTH

1390 NEXT PT

NEXT I :: MEMH1 :: NEXT R

1416 R=25 :: C=0 :: RESTORE #1,REC R :: FOR I=1 TO A :: IF I (I) = "" THEN 1440

R+1 :: RESTORE #1, RED R

MAM NEXT I

FRINT #1: PM, SAV

INPUT RECORDS TO, ALTER

INPUT #1 REC 0:A

I FOR I=1 TO A :: INPUT #1:I库(I)

.: NEXT I :: RETURN

1510 R=25 :: C=0 :: RESTORE #1, REC R :: FOR I=1 TO A

#: RESTORE #1, REC R 1530 NEXT I 1540 INFUT #1:PM. SAV

1550 RETURN:

DISPLAY AT (12, 10) ERASE ALL: "WO

RKING..." :: RETURN.

1588 C=5 :: |CALL CLEAR :: FOR B=1 T O A+1 :: DISPLAY AT (B+2, 1):STR \$ (B):" :: NEXT B

#590 FOR I=1 TO A :: DISPLAY AT (I+2

,C):I\$(I):: NEXT I :: RETURN

1.600 DISPLAY AT(I+2,5): "\*PRESENT MO

NTH/SAVINGS" :: RETURN

THE END





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# Persuasion . . . from p. 13

Hence the black outline. It shuts off the electron beam and assists the eye, making the bars appear sharper. Because the bars are the main part of the graph, a third consideration is involved: Outlining makes them stand out.

Putting outlines around bars with TI BASIC is difficult because only two colors are allowed within a character block. For instance, if the screen is blue and the bar is to be red and have a black outline around it, many bar heights cannot be defined because they would require blue, red, and black in the character

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block used for the top of the bar. The program gets around this problem by having a rather wide black band across the top of each bar in conjunction with the use of two characters at the bar top. This black band is distributed between the two characters so that only two colors are needed in either character. The topmost character (I call it a *barcap* in the program) has the colors black and the screen color. The character just below has the colors black and the bar color (it is called a *barhead* in the program). How much of the black band is Continued on p. 62

	TABLE 1. PROGRAM MO	DIEICATION EVALUES	
	TABLE I. PROGRAM MO	OFFICATION EXAMPLE	3
CHANCE	NUMBER: INSERT	(HAVCI	EVITNE SA MBER INSERT
Tic	290 TITLLINEIS TOTAL OF 300 TITLE, INE2S = "PECAN GAP	Scale numbering to 0.2.4.6.8	NOTE Will be printed vertically
He to one ne	290 TITLEUNETS - CORN YIFED 500 THEE INF 'S =	Vertical axis label	740 VERTICALIS-PPOWER 750 VERTICALIS JOULES/SEC
post on or top	3 () RO 3 32(r ( ) = 15		NOTE: To print a label vertically use 2040 GOSUB 2430 2080 GOSUB 2430
	NOTE Wall start tibe at row three col, mn sitteen. Opper left corner of the case will be at row two, column features.	The %" label on the bars to A B C D	191 (DINULETTER\$14) 192 LETTER\$ (1) = A 193 LETTER\$ (2) = B
54.) 3'5()	330 LA3FLS - PLOT NUMBER 340 KOW = 73 350 COEMN = 17		194 1 F (TERS (3) = ( 195 1 ETTERS (4)   D 1900 1 ABE1 S = LETTERS (BAR)
	360 CaCSE B 2380	Bar spacing to one column	1330 CLMN 4*BAR
1	643 GOSUB 2460 NO E. GOSUB 2130 prints vertical	1st bar location to column 14	1330 CIMN - 41BAR - 11
	= ibcls and GOSUB 2480 prints = irrzumal labels	The number of bars to three	1320 FOR BAR = 1 TO 3
net.	NO E Bar number one will be plot	Grid line spacing	HI30 FOR ROW-320 to 1 STEP - IN- where N = 1.2 - or 5)
	ed 32 unas high and 15 could be conted on the bar. Bar number two		NOTE Other possibilities exist
	will be plotted tourteen units high and 7 could be printed with that bar	To remove my name from your graph	Delete lines 1130 and 1140
	Sta Should be coordinated with the score on line 720	The colors of the	680 BARCOLOR1 = mumbers trop
. h 1 1 1 K	**************************************	Datr's	690 BARCOLOR2   1 to 16 700 BARCOLOR3 = representing 710 BARCOLOR4 = colors
	NOTE Many other possibilities exist fit k marks need to be coordinated with gold fines.	Move the vertical axis to column 10	1010 ( Ol = 10

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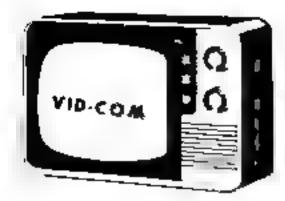
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with the most betrendous creatures he could pull from the dark recomm of his mind. No one has tried to stop him, until now Your task in to find the legendary scepter and rescue the princess so she may

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#### Counting Fun from n 34

Serial or Parellel (specify)

Serial or Parallel (epecify).

Coun	ting t	un from p. 34
474	CALL	CHAR (152, "7EFFFFE7E7FFFFF
	₩")	
128	CALL	CHAR (153, A\$)
438	CALL	CHAR (154, "FFFFFFFFF7F3F0F0
	1")	
448	1. 11	CHAR (155, "FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
	0")	
456	1 1	CHAR (156, "0103070F1F3F7FF
	F")	CHARLET MORRESCHICK
	EHLE.	CHAR(157, "BOCOEOFOFSFCFEF
	'	CHAR (142, "FFFFFFFF")
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1		CHAR(143, "01010101010101F
	E )	Circuit Vision V
496	CALL	CHAR (194, "8080D15373733333
	(1")	1
596	CALL	CHAR (105, "0078FEFF9393FFF
	E")	
510	111.6	CHAR (106, "30303030303030303
	(%)	
325	1111 11	CHAR (107, "30303B1F0F03030
	3")	CSMODALAGO MERCECERENTENE
	E H Y	CHAR (108, "30FCFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
=60	COL	CHAR (109, "03030303030311F3
	F")	0141111011 0000000000001110
556	CALL	CHAR (110, "FFFFFFFFFFFFECFC
	F")	
560	CALL	CHAR (111, "000000000000000E0F
	(P)	
576	11 3	CHAR (118, "C3E7FF7E7E3C3C1"
	8")	
236	CALL	CHAR(141, "00000003F35FFFF2"

**390** ICALL, CHAR (159, "0060E17E7E3E0B1

AND CALL CHAR(119, "9C9CBBBBFE3E3E1

FOR N=1 TO B 738 IF A=1 THEN 790 THEN 820 IF A=3 THEN 850 768 F=F+1 60SUB 1850 **786** 6010 870 **文字相** X = X + 1 60SUB 1530 BIN GOTO 670 828 Y=Y+1 **830** 605U9 1630 848 GDTD 870 60SUR 1730 **870** C=C+5 BOB NEXT N **日本的** R=R+6 POB NEXT L PER FRINT "HOW MANY 920 CALL HOHAR (23, 16, 118) 118) DALL HCHAR (23, 12, 118) #40 CALL HCHAR (23, 14, 118) PER INPUT 6 FA IF G=X THEN 1010 976 W=W+1 **780** GDSUB 2010 保持的 PRINT "NO...";X 1000 GOTO 1030 は日は後 ドードナル 1020 GOSUB 1960 FRINT "HOW MANY **E 640** CALL HCHAR (23, 16, 141) 1.850 CALL HOHAR (23, 12, 141) 1040 CALL HCHAR (23, 14, 141) 1070 INPUT H

1000 IF H=Y THEN 1130

ELLO PRIND "NOL\_\_ "; Y

1890 W=W+1

1130 F=F+1

11.00 GOSUB 2010

1126 GOTO 1150

##0 GOSUB 1960

56

620 F=0

430 X=0

440 Y=0

450 Z=0

560 K=10

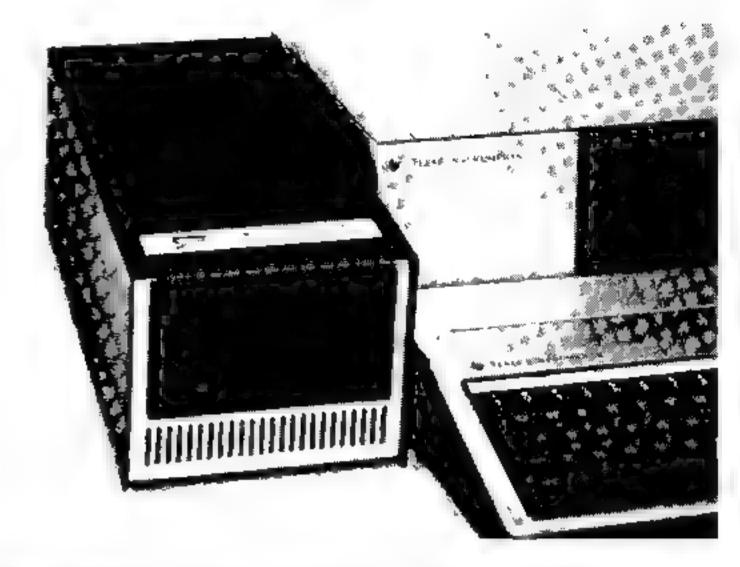
610 RANDOMIZE

570 CALL CLEAR

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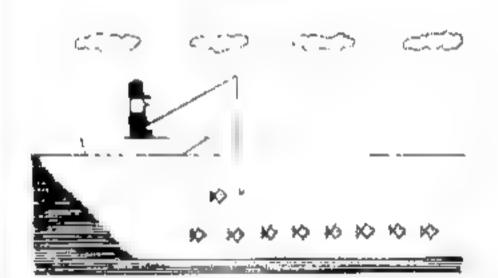
Counting Fun

```
PRINT "HOW MANY !:
DALL HOHAR (23, 16, 159)
CALL HOHAR (23, 12, 159)
INPUT 1
MANN IF I=Z THEN 1250
1 GOSUB 2010
PRINT "NO..."; Z
1 - F - F + 1
MINIMINERINT "HOW MANY
1100 CALL HCHAR (23, 16, 119)
| CALL HOHAR (23, 14, 119)
INFUT J
MINIMUM IF JEP THEN 1370
### 60SU8 2010
MIND FRINT "NO. . . " . P
 60TO 1390
1960 1960 1960
MINDEN THEM
     ":0
 V=X+Y+Z+F
 IF C=V THEN 1460
GOSUB 2010
 |構想機||FRINT "NO...": V
60TO 1480
 F=F+1
60SUB 1960
 WHEN PRINT "YOU HAVE GOTTEN ":F:" R
    IGHT"
 MANDED "; W
PRINT
        "I LOVE YOU, "KIS
INFUT US
60T0 610
MEM REM
        HEART
CALL HCHAR(R, C+2, 12B)
CALL HCHAR (R, C+3, 129)
CALL HCHAR (R, C+4, 130)
CALL HCHAR (R+1,C+2,151)
```

AND CALL HCHAR (R+1,C+3,132) **注意中** 日ALL HOHAR (R+2, C+2, 133) 1600 GALL HOHAR (R+2, C+3, 134) 1610 CALL SOUND (500, -1, 2) 1620 RETURN KANA REM BUS #644 CALL HOHAR (R, C+1, 136) 1650 CALL HOHAR (R.C+2, 137, 3) # GALL HOHAR (R+1, C, 139) 1670 CALL HCHAR (R+1, C+1, 130, 4) 1686 CALL HCHAR (R+2, C+1, 144) 1690 CALL HCHAR (R+2, C+3, 144) 1700 CALL SOUND (200, -2, 2) 1710 CALL SOUND (300, -2, 2) 1720 RETURN 1750 REM DUCK 1740 CALL HCHAR (R, C+2, 152) 1750 CALL HCHAR (R+1,C+2, 153) 1760 CALL HOHAR (R+2, C+3, 153) 1770 CALL HOHAR (R+2, C+2, 154) 1780 CALL HOHAR (R+2, C+4, 155) 1790 CALL HOHAR (R+1,C+4,156) 1800 CALL HOHAR (R+1, C+3, 157) 1810 CALL HOHAR (R+1,C+1,142) 1820 CALL HOHAR (R+3, C+3, 143) 1830 CALL SOUND (800, -3,2) 1840 RETURN 1850 REM ET 1880 CALL HCHAR (R, C+2, 164) **1870** (R, C+3, 1:05) 1880 CALL HCHAR (R+1, C+2, 106, 2) 1870 CALL: HCHAR (R+2, C+2, 107) 1900 CALL HCHAR (R+2, C+3, 108) 1**910** CALL HCHAR (R+3,C+2,109) 1920 CALL HCHAR (R+3,C+3,110) 1930 CALL HEHAR (R+3, C+4, 111) 1940 CALL SOUND (700, -4, 2) 1950 RETURN 1760 REM RIGHT SOUND 1970 CALL SOLIND (200, 880, 8) 1960 CALL SOUND (200, 988, 9) 1770 CALL SOUND (300, 1047, 0) 2000 RETURN 2910 REM WRIDNIG SIDUND 2020 CALL SOUND (500, -7,8) 2030 RETURN

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Many computer enthusiasts have done. well with the "small is beautiful" trend for home use, and even for businesses of Kool-Aid stand status. But sometimes a small beautiful thing can turn on you like a paby coral snake—leading to irreversible nerve damage.

In the case of the Pay 'N' Throw discount stores, someone in middle management decided that the store in Backwater, Washington could be handled by the Trymex Unclear computers—a few in each department, a small swarm in all.

Dick Dren, an MBA fresh out of Tupelo Business College and Skin Diving School, had surfaced in Backwater last winter and 'mmediately came on board at Pay 'N' Throw as their systems manager. When Dren hit upon the Trymex Unclear plan, he confidently walked into the office of store manager Herb Winemouth and boldly stated, "I think we should...

"Go for it!" said Winemouth, slamming nis bottom desk drawer and wiping his chin. That week the computers were configured, the interfaces implemented, the documentation deciphered, the hardware nandshooked, and the employees enabled.

The computers went straight to their main task: inventory. One department— Pets—actually managed all right with the new machine. There the inventory was low because of certain trends in society, e.g., there was a preference for robot dogs because they didn't get rables and didn't sned on the lawn. (Robot breeds were in the hardware department.) And sales of tropica, fish were gasping too. After all, who would want to maintain an aquarium when you could program a whole screen ful of neon tetras in Extended BASIC? And if you got't red of a sideo fish, you could always delete it without the guilt that comes with pulling the handle on the toilet

By Greg Roberts 99 er HCM Statt

Such being the case, the pet people were able to cram most of their data into the little black box, but other departments were not so successful. When the pharmacy logged in its Tylenol substitutes, the machine's memory swelled to capacity and caused all sorts of headaches. Unable to make the machine snap out of its narcosis, one of the pharmacists looked for solutions in—of all things—a printer manual, and ended up soaking the computer in Epsom salts.

In the store cafeteria the computer got a health inspector's welcome. The cooks just let it sputter and fry.

"But you're supposed to be using it to keep track of your recipes," Dren told them.

door of the microwave," they snarled, shaking their Teflon spatulas menacingly.

Dren slinked away to the clothing department where he tried to ensconce himself in a dressing room; here a polyester sheathed salesman buttonholed him and complained that static electricity from an Icelandic muff had wiped out an afternoon of data processing. Dren hovered over the computer in a nice bit of theater, already aware that there was

no pulse. The Unclear really didn't have the power to keep track of a tie rack much less a whole department.

But what is the point of training our telescope on every square yard of battlefield? Suffice it to say, the inventory could have been handled better had the clerks marked down the number of purchases on the back of an old Weedeater carton, deducted 25% for shoplifting, and flipped a nickel to close any remaining gaps.

The Trymex Unclears coughed their last—and stirred up the worst panic—in the payroll office. An overworked computer printed out a \$20,000 paycheck to a stockboy who rode his b'cycle to the nearest bank before payment could be "Everything we need is printed on the stopped. His last postcard was plastered with Tahitian stamps. The machine aliot ted a paycheck of \$1.36 cents to Dick Dren. His boss, Winemouth, suggested that this amount was more than adequate severance pay considering the navoc brought down on the store.

Yes, small is not always beautifu anyone who has been snapped at by a locked-up chihuahua in a parking lot knows that—and some computers can turn out just as nasty,

# Grandma Makes a Wrong Turn

Out at the end of a completely different Ilow chart is one Grandma Leathers, who opened a little mashed potatoes shop in Peelings, Idano. The shop soon got to be one of the most successful businesses in Tuper County, "The food is terrible," Crandma admitted, "but it's tast—and that's what people care about most. We've got a drive-up window you don't even have to slow down for. We can throw a masned potato pie through your car window, take the license number, and send a monthly bill. If you don't pay on time, we can always resort to an old trick from the sheep and cattle wars: burn down your barn."

Eyed Vegetables Inc. grew steadily until Grandma was talked into buying a huge. mainframe computer—a muscle-bound Greenby-Packard 5000 loaded with a thousand megabytes. The salesman, a R'chard Tater from Pocatello, had been pedding used Pontiacs and stove-piped trailers for sheepherders when he switched

overnight to computers:

The plaid-jacketed hustler with the hair combed up from the back of his neck to nis occapital tori surveyed Grandma's business for about eight minutes; then, working from the premise that the bigger the computer the bigger the sales commission, he urged purchase of the GP 5000. with super quad Winchesters, supported by a whole drawerful of complex software. programs including Wordscar, Visceracalc, and many others too mind-warping. to mention.

It is almost incredible that a shrewdbusinesswoman like Grandma could be taken on such a ride, but we must consider that she was 91 at the time, and possibly some of her cerebral circuitry was starting to short out. And there may be some explanation in her description of Tater, "Dick is so sincere—and cute too kind of reminds me of Douglas Fairbanks."

So Crandma reached into a Shirley Temp e cookie jar with its nose taped on with yellowed strips of cellophane tape and pulled out wrinkled handfuls of hundred-dollar bil s. Tater hadn't seen so many Franklins since the crash of the woodstove market--and Grandma had gone in only as far as the second knuckle.

Acting quickly, the salesman took it upon himself to line up some support services for Grandma's mainframe, making sure that he was getting a cut from all of them. He recommended a systems analyst, remote diagnostician, applications programmer, coordinator of operating systems software, hardware maintenance. personnel, and a computer operator.

"Who is this army?" asked Grandma. "They sound like they're from outer space. or Boise or something. What the devil is an applications programmer?"

Someone to write a program that keeps track of your pie recipes," said Dren.

"But I've only got three pie recipes to work with," she told him, "plain, medium, and normal."

Within a few months the cookie jar's belly clinked a lower, emptier note, and Grandma was concerned, "The computer seems expensive," she told Tater. "Do we really need all this power?"

"Let well enough alone," the salesman. told her as the two sat in front of a glowing cathode ray tube munching popcorn. The hustler enjoyed the company of this older, selt-assured businesswoman. "Remember, af the dip's too thick you can kill the sheep."

"But I'm losing a fortune,"

"There's more than one way to skin a grape," he advised, "Have you considered using mutton fat in your recipes instead or butter?"

"Why, I wouldn't even consider such." a thing unless I were absolutely desperate," she said, reaching for the yellow pages and looking under "controlled substances." Eventually she not only used the mutton fat in place of butter, she replaced the real potatoes with "imitation. freeze-dried potatoes" made from old paper-mill leavings. It had a telling effect on business. Even the graveyard shift from the mines at Anaconda couldn't handle her cooking anymore.

"Now what do I do with this fancy electronic brain?" she asked Dren, "eat it?"

"No need," he told her. "I'm taking you out for dinner at the Trail Boss In Paris Buffet."

And while the two entrepreneurs sat peeling the pate off a very rare Filet Rossini, Grandma's enterprise was buckling like a newborn lamb on bumpy. ground.

A few nights later, while she sat staring into a stein at the Pine Slivers Bar, Brian the bartender—who was also doing summer theater up at Sun Valley -sa d "The loss must be simply devastating, Grandma. dear."

"Not really," she said wistfully, "What's a couple of million dollars to someone my age? I'd just as soon have real teeth." But she shook her head and added, "It would be nice to aftord a catalytic neater for the camper—now that winter is almost here and maybe some new eight-track Conway. Twitty tapes too."

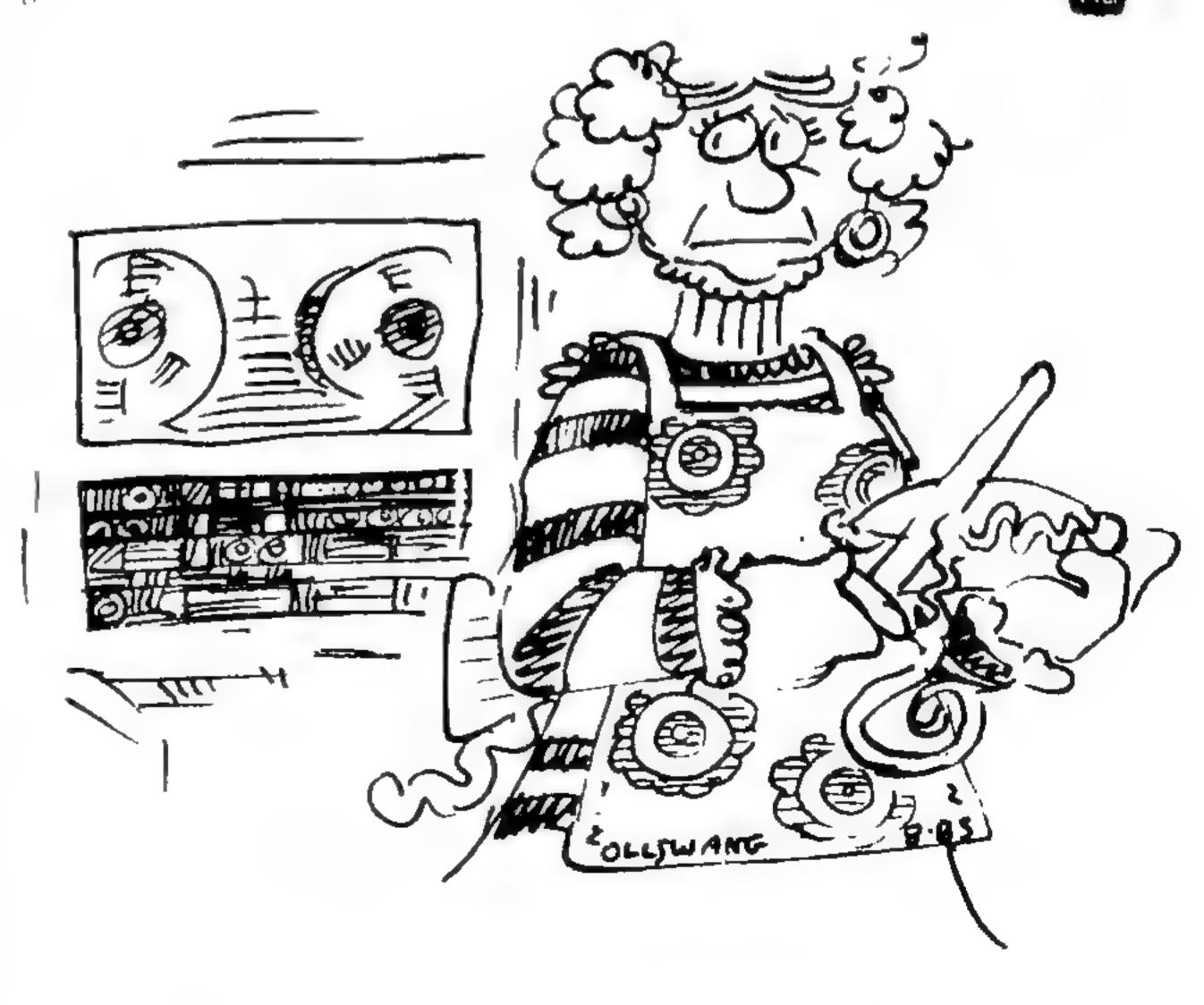
Just then the saloon doors swung open and the local barber rushed in. He handed Grandma two huge Safeway bags full of money. "This is from Dick Tater," ne blathered. "He was down at the snop getting a hair transplant, and when the operation started to go bad and it looked like he might not make it, he went to pieces. He had me go over to the bank and clean

out his lettuce crisper for you." "Well, this knocks me flatter than a stepped-on horned toad," said Grandma,

tipping the barber a dollar.

But there's more: R'chard Tater suddenly made a remarkable comeback from the operation. He and Grandma re-opened the shop and sold off the mainframe with enough money left over to buy a TI Pegasus. Lately the couple has been spending their weekends in Twin Fals.

The moral? We won't need a consultant to tell us what that is. Ever since our first hearing of The Three Bears we've heard about a thing called "just right."



59

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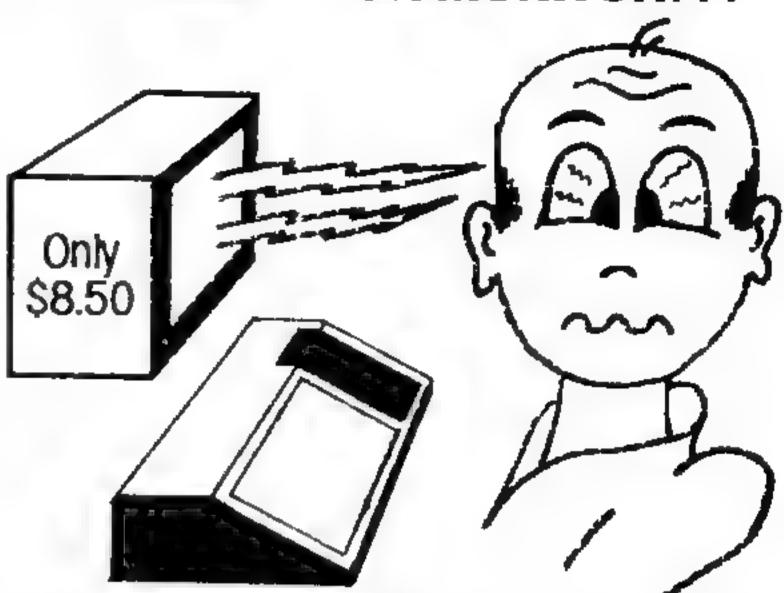
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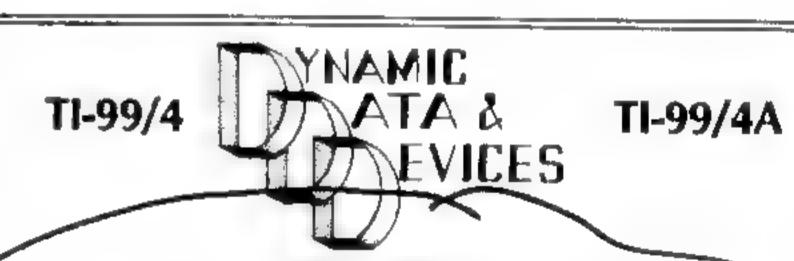
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#### Figure 1: Assembler Statements

These samples show the form of the assembler statements for a portion of the sample sprite program for the three assemblers. Note that this tigure shows only what you enter into the assemblers. The labels SS and SA would be defined later in the programs.

Figure 1A. 1 ne By-I ne Assembler	Figure 1B: MAX Assembler	Figure 1C: Dow Editor/ Assembler	
1 LWP1 > 70B8	10 DATA # DEF @SPRITE	L1 ·LWPI	>70B8
11 0, > 6 184	20 DATA # AORG >7D00	LI	0:>0384
11 1 > FF00	30 DATA SPRITE LWPL > 70B8	1.1	1;>FF00
BLWP 9>6024	40 DATA LEURO > 0384	BLWP	@>6024
t = 0 > 0400	50 DATA # LLR1,>FF00	LI	0, > 0400
1.55	60 DATA # BLWP @VSBW	1.1	1.55
L 2 40	70 DATA # LLR0. > 0400	LI	2.40
BLWP@>6028	80 DATA # LI RT.@\$\$	BLWP	@>6028
11.0. > 0300	90 DATA # L1 R2.40	Lt	0.>0300
11 T 5A	TOO DATA # BEWP @VMBW	Lt	LSA.
.1 2.21	110 DATA # LLR0 > 0300	LI	2.21
B_WP@>6028	120 DATA # LLR1 @5A	BLWP	@>6028
	130 DATA # LI R2.21		
	140 DATA # BLWP @VMBW		

		Figure 2:	Stati	stics			
MFCR	DISK DRIVE	PRINTER	SEC	XIMUM SMENT IZE	LABELS PER SEGME		MAXIMUM PROGRAM SIZE
	N.	N	7	44	9		744
ECKHAU5	l N	Y	V	anes	108		3808
DOW	Y	Y	5	12	40		3808
	MAX MUM	NUMBER	R OF	SAVI	is .	TI	ME 10
	LABEL	ASSEMBI	LER	SOUR		A55	EMBLE
MECR	LENGTH	DIRECTI	VES	STATEM	IENTS	5A	MPLE
T.	2	7		N		0 N	MINUTES
FCKHAUS	6	11		Y		80	MINUTES
DOW	\$	6		Y		5 N	MNUTES
	•						

Before you can execute your machine-code program from outside the Dow Editor/Assembler environment, you must make an entry for it in the REF/DEF table. You can do this easily with the MINI command, or you can use the assembler to do it. In either case, you must specify the entry point of the program (or programs) explicitly and adjust the LFAM if appropriate.

The largest program the Dow Editor/Assembler can process is 512 bytes of machine code. Again, you can segment your program if necessary. The manual estimates that this is roughly 150 source statements, but this can vary greatly. You can see now close you're getting by looking at the program counter as you go along; the beginning of the program is at absolute location 0 as far as this counter is concerned. Each segment can be SAVEd to tape by the Dow Editor/Assembler and LOADed into M'ni Memory at a different address. You can start the next segment with a NEW command and finish the whole process without ever leaving the assembler.

When you need to change a program, you use the OLD command to read it from tape and then edit it. When the revisions look correct, you LOAD the entire program or segment to Mini Memory again.

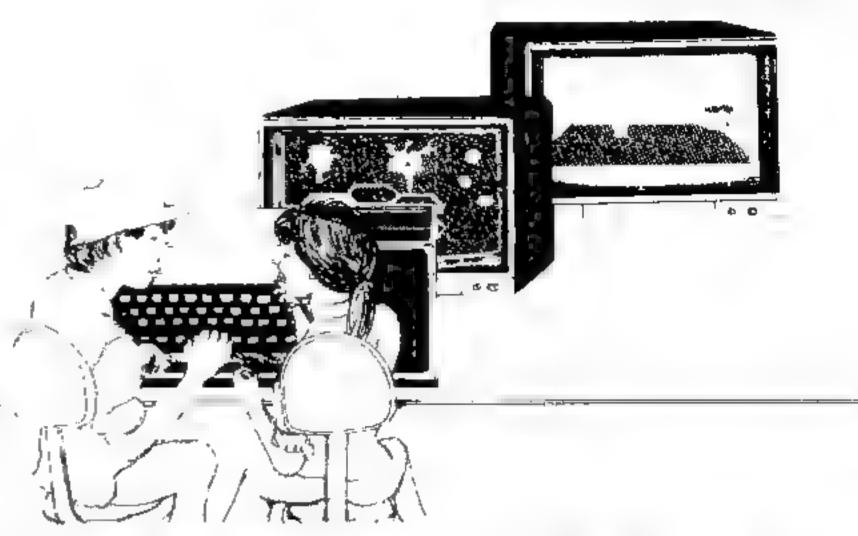
The Dow Editor/Assembler can work with a printer or a disk drive. You must change the assembler program (in BASIC) to use either peripheral. Directions for this are provided in the manual.

**Summary** 

The TI Line-by Line Assembler, the MAX Assembler and the Dow Editor/Assembler all help you accomplish the task of turning your Assembly Language idea into machine code. Your own needs—whether you want to use a printer and disk drive or modify your source program, as well as your speed preference and programming style—will determine your best choice. Hopefully the descriptions of these three assemblers will help you understand the differences between them and choose the most efficient one for you.

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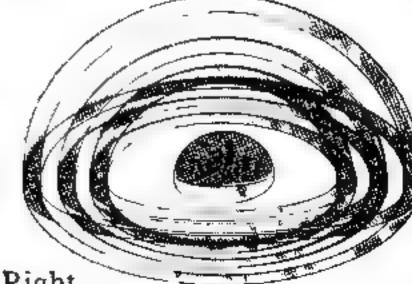
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Persuasion . . . from p. 55

in the barcap and how much is in the barhead is fixed by the data values for bar heights.

The bar ends up having three parts. Figure 3 shows these three parts and gives parameters for the datum used in the figure as an example.

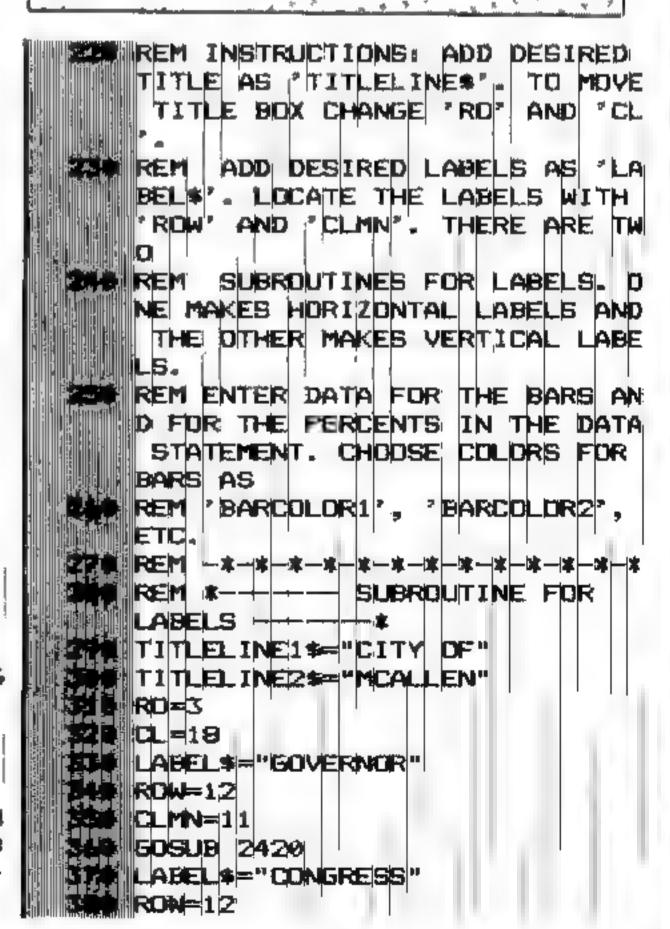
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		· · · · · · · · · · · · · · · · · · ·
		1 * BARGRAPHER *
1	THE PL	H # IBY #
	130 RE	1 * FRED ELLIS *
		1 *********
	FE	
	Million of the little in	99'ER VERSION 2.10.1
		PRESS ANY KEY TO EXIT PROG
ł		
ı		ABOUT 10400 BYTES
ı		RESERVED TO OPEN FILES
ı		
١	Committee to a subtract the little of the li	TO 680
		M INSTRUCTIONS: STATEMENTS M
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ì		WEEN THE BARBED WIRE -*-*-*-
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	Bargrapher
Explar	nation of the Program
Line Nos.	
100-270	Program header.
	Defines labels.
660-990	Defines bars and
	barcofors.
1000-1260	Prints baselines, grid
, , , ,	lines, tick marks and
	labels.
1270-2080.	Draws bars.
2090-2230	Creates title box.
2240-2400	Creates second line in ti-
	tle box if necessary.
2410-2460	Subroutine to print ver-
ę	tical labels.
2470-2510	Subroutine to print
	horizontal labels.
2520-2560	Subroutine to print bar
	stems.



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CLMN=25
LABEL - "CLEMENTS"
RDW=22
GOBUB 2470
ROW=23
LABELS - MC-
RDW=22
### GOSUB 2470 ### LABELS-"DONALD"
RDW=23 CLMN=18 GDSUB 2470
LABEL#-"DE LA"
CLMN=26
LABELS="GARZA"
CLMN=26 GUGUB 2478
RETURN REM * END OF BUBRUUTINE
FOR LABELS* DATA 4535,58,3317,42,3929,50,3
845,47 BARCDLDR1=5
BARCULURZE11
BARCDLDR4=3 SCALE=500
VERTICAL 1#="VDTE6 IN"
REM # CHARACTERS 71,72, AN
D 93 ARE AVAILABLE FOR TICK MARKS* DATA 91,000000000000000000000000000000000000
00000000000FE,73,00000000000000000000000000000000000
PRE REM - x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-
80FE0072FE00E0,76,FFFF00FF0000 FF00,77,C0C000FF0000FF00,78,00
0000FF0000FF00 DATA 97,030300FF0000FF,104,804
F79004F007F00,105,7F00497F0001 487F,106,00FE90F000FE90F0,107,
BIND DATA 112, COCOCOCOCOCOCO, 113,
00,114,0303030303030303,120,C0: C0C0C0C0C0C0C0,121,00,122,0303
930303030303 920 DATA 12B, D0C0C0C0C0C0C0C0, 129,
00,130,0303030303030303,136,C0 C0C0C0C0C0C0C0C0,137,00,138,0303

030303030303

830	DATA 144,FFFF0000000000000,145,
	FFFFFCECFCCCCC, 146, D0C0D0D0C0
	C000C, 147, D000FCFCECFCFFFF, 148
840	DATA 149,03033F3F373FFFFF,150,
	0303030303030303,151,FFFF3F373
	F3F0303,152,00000000000000FF,1
	SS, FF RESTORE 770
	FOR K=1 TO 35
	READ CHARACTERNUMBER, HEX \$
880	CALL CHAR (CHARACTERNUMBER, HEX#
	). NEVT V
111111111111111111111111111111111111111	NEXT K
111111111111111111111111111111111111111	CALL COLOR (10,2,8)
	CALL DOLOR(11, 2, BARCOLOR1)
	CALL COLOR (12, 2, BARCOLORS)
	CALL COLOR (13, 2, BARCOLORS)
	CALL COLOR (15, 16,8)
	CALL COLOR (16, 16, 8)
	CALL SCREEN(E)
794	REM * BASELINE AND GRID
	LINES
LOIS	COL =1 .
	CALL HCHAR (21,00L,94,33-00L)
	FOR ROW=20 TO 2 STEP -2 CALL HCHAR (ROW, COL+1, 152, 30)
	NEXT ROW
1040	CALL HCHAR (1, COL+1, 153, 30)
	REM * VERTICAL SCALE*
	LABEL*=SCALE*
	CLMN=2
1110	G09UB 2420
1120	REM # TICK MARKS
11.38	CALL HOHAR (23, COL, 105)
1 1 55	CALL HEHAR (23, 32, 106)
	CALL HOHAR (22, 32, 75)
	FOR ROW-ZO TO Z STEP -2
	CALL HCHAR (ROW-1.COL, 92)
	CALL HCHAR (ROM, 32, 92)
	CALL HCHAR (ROM-1, 32, 93)
النمك و المعلالات	NEXT ROW
	CALL HCHAR (1, COL, 94)
	REM *
INChel who bid W	G09U8 290
انتش الكامادي المساكا	REM * DRAW BARS
	MASTER 1:4="00:000000000000000FFFFFFFFFFFFFFFFFFFF
	Co"
1270	MASTER 24="7F00497F0001487FFFFF
25. 25. 41	FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
1300	MASTER35="004F79004F007F00FFFF
	FEFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

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TI-EXTENDED BASIC CASSETTE • TI-99/4A complete instructions included S.A.S.E. for FREE CATALOG This column is an ongoing tutorial on the Multiplan software package. To obtain full benefits from this column, a newcomer to Multiplan may find it useful to read the previously printed columns.

he smallest addressable unit on the Multiplan worksheet is the cell. This means that you can "converse" with Multiplan about the contents of any cell on the worksheet. But Multiplan is not just a single-celled organism. In many cases, it can think in terms of rectangular groups of cells. And this capability expands Multiplan's usefulness significantly.

Rectangular groups of cells go by many names: tables, matrices, arrays. What you call a particular area depends on both its contents and how it will be used. You use a special syntax to indicate

a rectangular area to *Multiplan*, namely *upper-left-cell: lower-right-cell*. For example, in Figure 1 the boxed area would be called R1C1:R4C3.

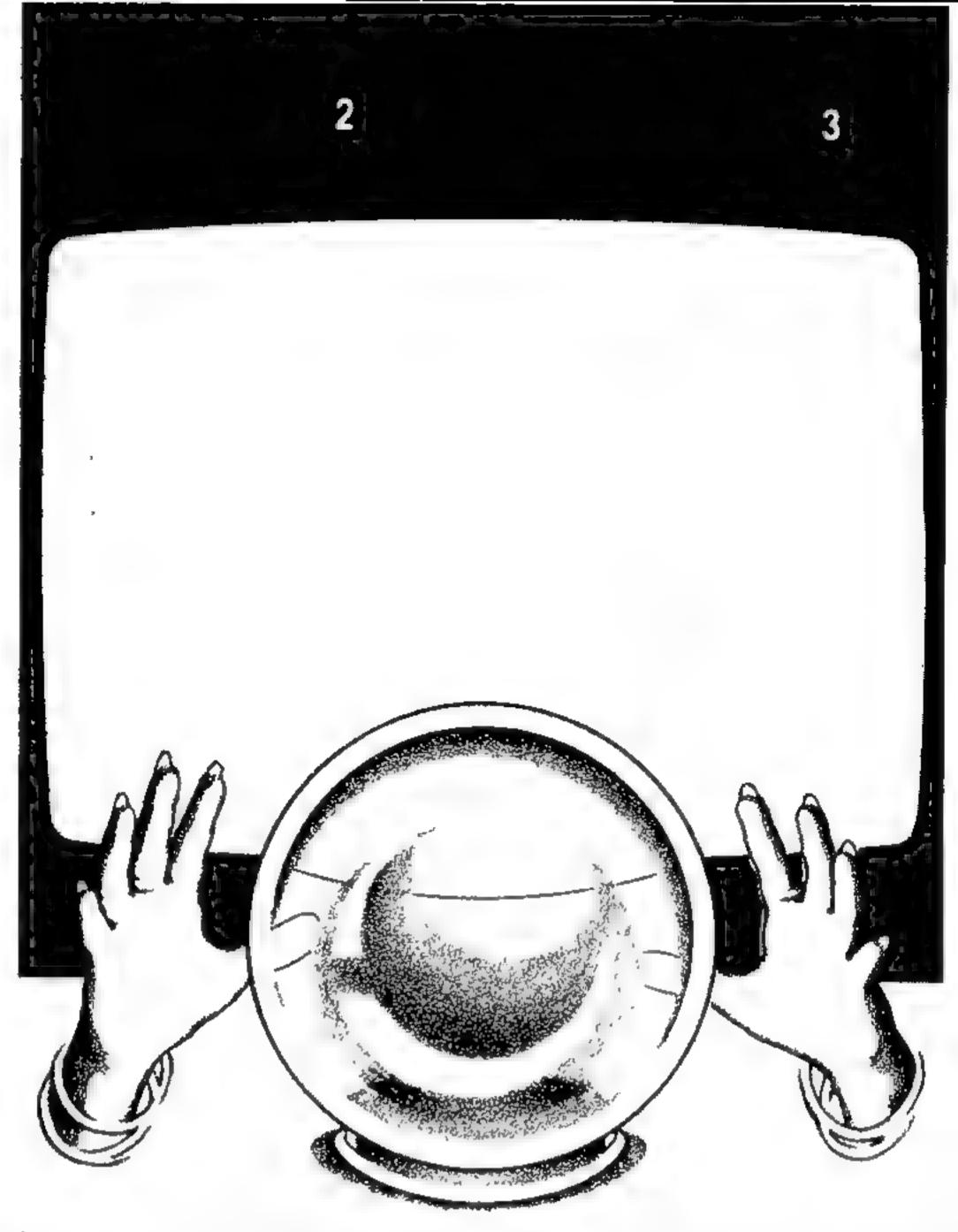
Once you start thinking in terms of rectangular areas, you will see how basic this concept is to *Multiplan*. Rows and columns on the worksheet are just rectangular areas which are one cell wide or long respectively. Even a single cell is just the smallest possible rectangular area.

Commands and Rectangular Areas

You can refer to rectangular areas in five of Multiplan's commands: Blank, Copy, Format, Name, and Print. Copy is the most interesting of these, so we will explore it first.

The Copy command has three sub-commands: Right, Down, and From. Copy From lets you move a whole rectangular area to another part of the worksheet while retaining it in the original spot as well. You can also Copy From a single cell to a rectangular area, although this is not nearly so useful. To see the difference, refer to Figure 1. The original worksheet contained only the rectangular area R1C1:R4C3. The top part of Figure 1 was the result of copying from R1C1:R4C3 to R6C2. Notice that you don't have to specify the boundaries of the destination area; *Multiplan* assumes that you are referring to the upper left corner of a rectangle that is the same shape as the "from" area. The lower part of Figure 1 was produced by copying from R1C1 to R6C2:R9C4. In this case the single "from" cell was duplicated throughout the rectangular destination.

Copy Right is a special case of Copy From. You can use Copy Right to make more than one copy of a rectangular area, but the cells you copy from must all be in the same column and the destination area(s) must be in adjacent columns. Copy Down is similar to Copy Right except that portions of rows are copied



to adjacent rows. There is one thing you should always keep in mind when you use all the Copy commands. The information in the information in the destination areas is wiped out when it is replaced, so you can lose whole areas of your worksneet by specifying a destination which contains information you meant to keep.

If you have a rectangular area that will be used frequently on your worksheet, then you may want to Name it to make things easier on yourself. The Name command assigns the label of your choice to the area. After that you can refer to it by its labe instead of the more cumbersome upper-left; lower-right notation.

The Blank command is used to blank out areas on a worksheet. If you use the Copy commands

extensively, you will sometimes find that a finished worksheet has several cells containing zeroes. You can use the Blank command to clean up your finished worksheet.

The Print Options command lets you designate any rectangular area for printing. If you don't want to print the whole worksheet, use Print Options to specify the area to be printed and then use Print Printer to actually print it out. This is a real time- and paper-saver when you are developing a worksheet.

The Format Cells command can be used to change the format in which the contents of a cell (or area of cells) are presented. A common example, which we have seen before in this series, occurs when most of the figures on a worksheet are dollars and cents but you need to use whole numbers in one column. You can accomplish this by setting the default format (command Format Default) to the most common format (say dollars and cents) and then using the Format Cells command to change just the area you need to integer format.

Multiplan makes it easy to use the complicated-looking rectangular area designations. You don't have to type them in; you can use the cell pointer to indicate the boundaries of the area you want. After you have selected the command (and possibly the sub-command) and arrived at the spot where the designation should be placed, just move the cell pointer to the upper-left cell of the area (if it's not already there). Then type: (colon) to tell the system you're ready to do the lower-right cell. Then move the cell pointer to the lower right boundary of the area. Multiplan will build the area designation on the command line for you as you follow these steps. This technique helps prevent mistakes, and it's easier on non-typists.

#### **Tables**

A table is a very useful type of rectangular area. As you might suspect, tables are used for looking up information. With

Multiplan you can define a table on the worksheet and reference

it from other places on the sheet.

An example which jumps to mind is preparing estimates for repair work. Imagine you run a very specialized business which repairs just one type of sewing machine. These hypothetical machines are so simple that most repairs consist of 5 common jobs. The business offers free repair estimates, and you would like to automate these estimates to cut down on the time it takes to prepare them and to increase their accuracy by eliminating addition errors.

Figure 2 shows the model for this example. I have taken poetic license and snown a bit more here than would appear on the screen at any one time. The "job table" for these 5 common jobs is at the bottom of the worksheet. To keep things simple, numbers 1 though 5 were assigned to the jobs. Each job has a verbal description, a price for parts to be used, and an estimated number of hours it takes to do the job. This description is there to save time; you only have to type the one-digit job number instead of the longer description. The parts prices are kept separately so they can be changed easily when appropriate. The labor is depicted in hours so that the labor portion of each job can be figured against the shop's current hourly rate, which may change from time to time. To make this figure meaningful, we will have to supply the hourly rate elsewhere and have Multiplan do the calculation. Because we will refer to this job table often, we will name it TABLE. Use the Name command, and specify TABLE to refer to R19C1:R23C4.

Now to set up the estimate form itself, shown in the upper part of Figure 2. The company's heading is typed in, and the nourly labor rate is also prominently displayed. Space is left to fill in the current date when the estimate is used. The plan is to have the person type only job number(s) and have *Multiplan* fill in the rest of the row. When job number is filled in, the program should get the description from the table and plug it in. The amount for each item should be calculated as the parts price

plus the labor hours, multiplied by the labor rate.

To calculate this we will use the INDEX function. INDEX returns the value of a cell from a table, which is just what we need. The general form of the function for this case is INDEX (TABLE, row, column). This example will be very simple because the job numbers 1 through 5 can be used as the row designators in the INDEX function. When we want to get the description, we'll specify column 2. In other words, the description for job #3 would be just INDEX (TABLE,3,2). Similarly, the parts price is always in column 3 and the labor hours are in column 4. Thus the only variable we'll have is the job number; everything else depends on that.

Now to make the formulas for the first detail row of the estimate. The job number will be filled in when the worksheet is actually used; leave it blank for now. Under DESCRIPTION, we want to use INDEX (TABLE,RC[-1],2). To enter this, put the cell pointer at row 9, column 2 and type = to indicate that a formula will follow. The formula can be typed in directly, except that the RC[-1] can be indicated by moving the cell pointer 1 column to the left. Don't be surprised at the #REF! error which results; that happens because we haven't filled in a job number

yet, so *Multiplan* is unable to look it up right now.

The next thing to do is to fill in the formula for AMOUNT. This gets a bit complicated. For one thing, we'll need to use the labor rate here. First we Name the cell containing \$25.00 so we can refer to it by name; let's call it RATE. Now put the cell pointer in the first row under AMOUNT, type ==, and then enter the formula: INDEX(TABLE,RC[-2],3)+INDEX (TABLE,RC[-2],4)\*RATE. The RC[-2] terms refer to the job number again. In English, this formula is just parts amount + hours × rate. Notice that we don't need parentheses around the hours × rate term because *Multiplan* automatically does multiplication before it does addition. The REF! message will appear here too, but it will go away when we fill in a job number.

So much for the prototypes of the formulas. If an estimate has more than one detail line, the person can Copy Down the pro-

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Figu	ire 2: Estim	iate Model		
	1	2	3	4
2 3		SWANSON REPAIR 128 MAIN ST. NEWTON. OR 98765		ENT RATE IS ER HOUR
5 6 7		REPAIR ESTIMATE	6/15/83	
8	JOB #	DESCRIPTION	AMOUNT	
9		3 REPAIR PLATE	50 00	
10		2 ALIGNMENT	26.50	
11				
12				
13				
14				
15		TOTAL	76.50	
16				
17	JOB TABLE:			
18	JOB #	DESCRIPTION	PARTS	HOURS
19		1 REPLACE		
		MOTORS	59.95	0.50
20		2 ALIGNMENT	1.50	\$1.00
21		3 REPAIR PLATE	25.00	1.00
22		4 GEN. OVERHAUL	12.50	1 50
23		5 REPLACE ARM	48 00	1 25

Figure 3: Printed Estimat	е
SWANSON REPAIR 128 MAIN ST. NEWTON, OR 98765	OUR CURRENT RATE IS \$25.00 PER HOUR
REPAIR ESTIMATE	6/15/83
DESCRIPTION REPAIR PLATE ALIGNMENT	AMOUNT 50.00 26.50
TOTAL	76 50

65

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totypes as many lines as needed. We don't want to do that in the model because of the REF! messages, which will remain if there is only one detail line on a particular estimate. But since the maximum job might have 5 detail lines, we want to leave the next five lines clear in case they are needed. We need a total line, so let's put that on row 15. Enter IOTAL under DESCRIPTION. Move over under AMOUNT and fill in the formula SUM(R[-7]C:R[-1]C) using the cell pointer to refer to the rectangular area to be summed into the total.

There's one more thing to consider before we declare the model finished. Presumably the customer will receive a copy of the estimate, but he or she should not get a copy of the jobs table. The job number is also meaningless to the customer. Multiplan can take care of this easily. Use the Print Options command to designate that only the area R1C2.R15C4 be printed.

Then save the finished model.

The next time an estimate is to be prepared, call up a copy of your model (via the Transfer Load command). Fill in the date. If only one detail line is needed, simply fill in the job number at row 9, column 1. If you need three detail lines, Copy Down 2 cells from R9C2:R9C3 and then fill in the three job numbers on rows 9 through 11. Then print the estimate (and possibly an extra one for your own records), and you're done. Figure 3 shows a printed estimate containing two detail lines.

### Absolute vs. Relative References

This example points out the need to distinguish between absolute and relative cell references. A cell reference such as R1C1 is called absolute because it refers to a definite cell, the one at the home position. There is no possible ambiguity with a reference like this. The labels TABLE and RATE are both absolute references.

A cell reference such as RC[-2] is called a relative reference because it designates a cell only with reference to the present location of the cell pointer. This particular example means "the cell which is in the same row and two columns to the right of where I am now," so the meaning of this reference can vary.

In the estimate example, we used relative references for the job number in the INDEX functions. This was because the prototype detail line might be copied down in the future. Suppose we had been short-sighted and specified the DESCRIPTION formula as INDEX(TABLE,R9C1,2) instead of INDEX(TABLE,RC [-1],2). The first line of the estimate would be fine, but what would happen when it was copied down to the next line? The absolute reference would cause *Multiplan* to base the second line on the job number in the first line, with disastrous results.

But don't think that the safe way is to make all references relative. Consider the labor rate, which was an absolute reference in the example. Suppose we had decided to make that a relative reference too. Then suppose that instead of typing RATE (or using its absolute address of R2C3), we had used the cell pointer to pick out that cell in our prototype AMOUNT formula. This would have put R[-7]C in place of RATE in the formula. Again, this would have been fine in the first line of the estimate. But how about the second line, if the formula was copied down? The reference would be one row too low; Multiplan would pick up 0 for the labor rate because the referenced cell (R3C3 this time) is blank. As you can see, the concepts of rectangular areas, and relative and absolute addressing are central to understanding Multiplan.

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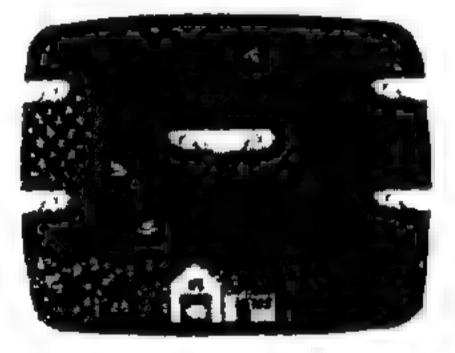
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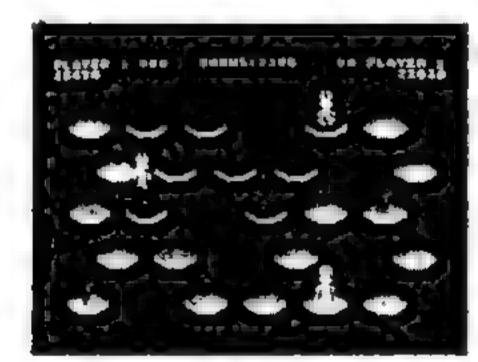
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Group Grapevine: News of T1 Users Groups From Around the World.

A plea for help has come to us from a desperate W. Smythe of Ontario, Canada. Ms. or Mr. Smythe writes that he or she has recently been assigned the task of organizing a "programme. . . which will satisfy and stimulate the interest of a small but enthusiastic Users Group." Those of you with several successful meetings and agenda under your belts may wish to respond directly to the aforementioned W. Smythe at 22 Lavina Crescent, Leslie Park, Nepean, Ontario, K2H 7P2, Canada 830519.

Because Smythe notes in his/her letter that time is of the essence, we will try to oblige this urgent request for a "diversified programme" by here noting some tried and true ideas that have kept users groupies coming back for more

1. Bring in a Celebrity. It can be both informative and inspiring to see how the experts design, program, debug and run their own software. For example, the San Gabriel Valley 99/4 User's Group recently had two professional programmers come in and share their graphics expertise. You can contact the group at 1008 Dore Street, West Covina, CA 91792.

2. Hold a Workshop. Many group newsletters include regular questionnaires for future workshop topics. The Rocky Mountain 99'ers (P.O. Box 3400, Littleton CO, 80161) is just one group who has held workshops on Extended BASIC and Assembly Language game programming.

3. Get Competitive. Contests for the best program, game or graphic design are a user group staple. A local computer dealer might even be persuaded to donate a prize. Recently the Airport Area Computer Club at P.O. Box 710, Coraopolis, PA 15108 initiated a masthead design contest to come up with a sharp new look for their newsletter.

4. Form Splinter Groups, This is an especially good idea for large groups with diverse interests and proficiency levels. MUNCH, The Massachusetts Users of the Ninety-Nine and Computer Hobbyists (1241 Main St., Worcester, MA 01603) has a separate beginners group, and many users groups form special interest groups to delve into such topics as Assembly Language, Computer-Assisted Instruction, and Game Designing.

5. Questions from the Floor, Communication is what users groups are all about. The Cleveland Area 99/4A Computer Users Group ends every meeting with an open forum during which members can pose questions, exchange information and offer suggestions. You can contact this group at 2385 Stanford Dr., Wickliffe, OH 44092.

6. Start a Library. The Central Texas 99/4A Users' Group (P.O. Box 3026, Austin, TX 78764) is just one of many users groups that provide software libraries for the use of their members. Books and journals can also be shared.

7. Write to Us. Last but not least, send us a note or newsletter letting us know what you are up to. We'll try to print your name, address, appeals for members, entreaties for newsletters to exchange and any other news that's fit to print.

OK, W. Smythe, we expect to hear that your first meeting was a rousing success. Write about it to the Users Group Editor, 99'er Home Computer Magazine, 1500 Valley River Drive, Suite 250, Eugene, OR 97401.



Dear Sir.

Recently my daughter Lauren celebrated her sixth birthday. Like all kids her age she wanted a cake which depicted her favorite thing, in this case MUNCHMAN! My very talented friend, Bob Gwinn (also a 99/4A enthusiast) offered to do the baking and decorating. We thought you might like to see the results. We think many of your readers might like to try to create other theme cakes for their kids—next year PARSEC!

Dee Urban Orchard Park, NY

Dear Sir

I was wondering if any of your readers could take the time to help me with some "Call Sounds" that I don't know how to do I need the sounds for a game I am making based on the game by Williams Electronics called "Joust" Besides these sounds I am interested in learning how to make a variety of sounds other than musical sounds

Ty Morrison Riverside, CA

A previous issue of 99'er HCM will give you some good tips on the production of musical and non-musical sounds using the CALL SOUND subprogram, Ty Livening Up Your CALL SOUNDS in Volume 1. Number 6 (the last issue before 99'er went monthly) provides a guide to the production of a variety of sounds bees, teleprinters, sword clashes, footsteps, sirens . We still have a few copies of that back issue in our warehouse, but the supply is limited

Dear Sir

In the May 1983 issue Greg Roberts states in his article "From Cut & Paste to Keystroke" that it would cost from \$50 to \$1000 to bring a TI-99:4A up to word processing status. From the price list I have from Texas Instruments for the equipment required, as listed in the article "Word Processor Market Basket," it would cost me over \$2200 to achieve word process status since all I have is the TI-99-4A, TV and cassette recorder. What accounts for the significant difference?

Melvin Fields Aptos, CA

The possible prices depend on a number of things, Melvin In your case, for instance, the biggest expense would be the hardware components necessary to communicate with a printer, plus the printer itself

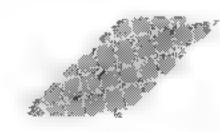
Several manufacturers besides TI produce the hard-ware interfaces, with various capabilities and at various prices. One manufacturer (Model Masters) produces an inexpensive RS232 interface that uses the joystick port. If you want to build your own RS232 interface through the joystick port, the June and July issues of 99'er HCM gave you the plans and software (JoyTa k is Cheap). For both of these devices, TI's Mini Memory Cartridge is required.

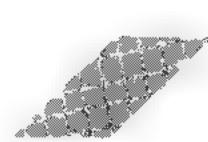
The cost of a printer depends on your particular needs. If a no-frills, low-speed dot-matrix impact printer will satisfy your needs, you'll be able to get away with a minimal outlay. And if a plain-paper printout is not mandatory, you might consider a full-feature thermal printer. In this issue (Per phera Visions, p. 41), we review an 80-column \$200 thermal printer, for instance. If you want correspondence-quality printing, expect to lay out a good deal more. Printer speed, software options, paper size and type, among other things, will affect the cost of your word processing system.

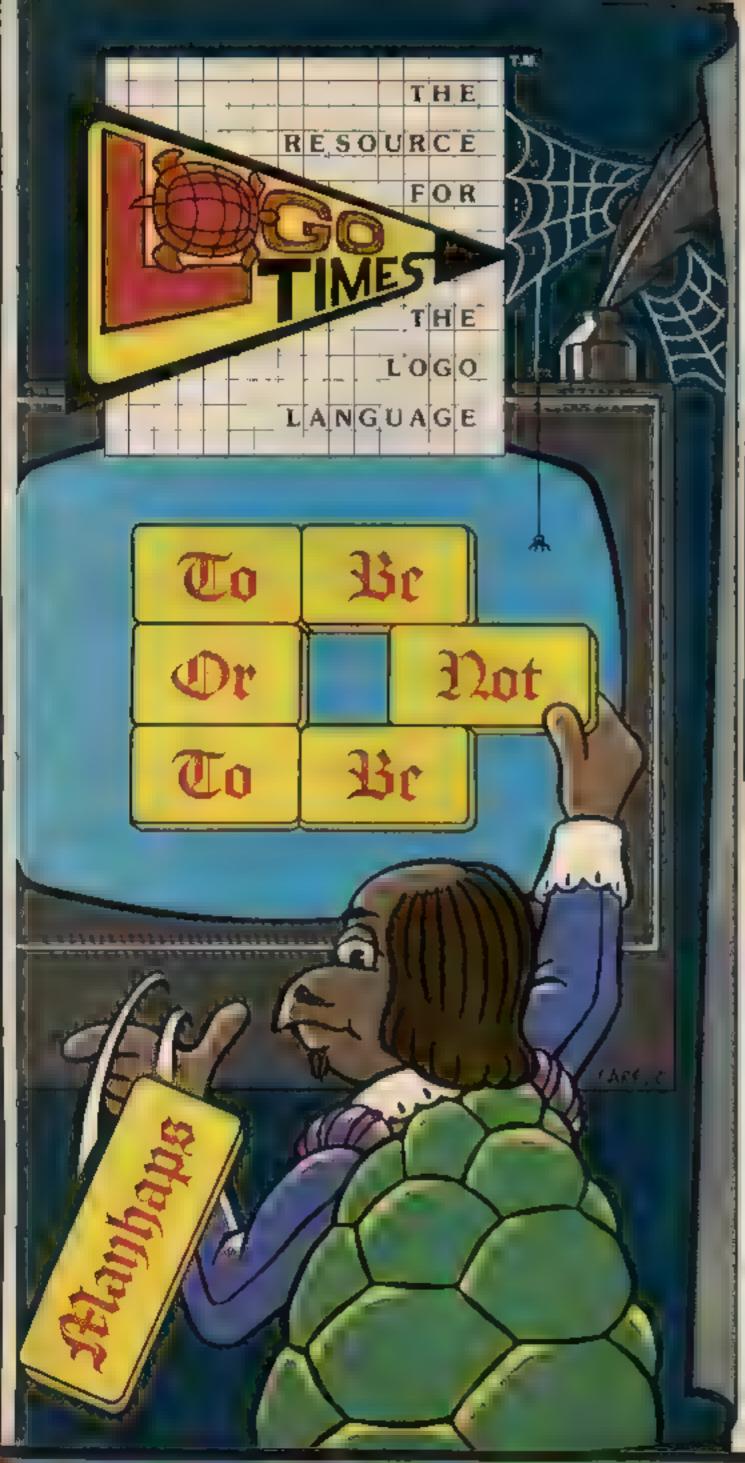
Then there's the question of software. The cost here can range from free to substantial. Tex-Scribe (December, 1982 issue of 99'er HCM) only costs the time and effort to key it in. There are also inexpensive software packages that will run on minimal systems. And there soon will be a cassette-based version of TI's word processing software for use with the Mini. Memory cartridge (T.-Mini-Writer, announced for third quarter, 1983). If these systems are too limited in scope for your particular needs then there are third party software packages (advertised in this magazine) of varying degrees of complexity—running all the way up to TI's own package, TI WRITER.

In other words, how much you might spend depends on the present state of your system your projected needs and your ability to shop around and find the best pieces for hardware and software









# TURTLE TEXT

A Response to Muller's Challenge

By Roger B. Kirchner

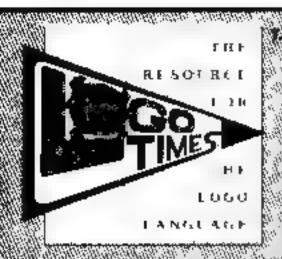
Last month we published Roger Kirchner's reply to the third of Jim Muller's challenges, that someone write a multi-colored tessellation procedure for H LOGO to graphically represent multiple depths of recursion. (You may remember that Muller, President of the Young People's LOGO Association, asked other champions of LOGO to come forward with solutions to the problems he posed in urder to answer what both he and Kirchner cell were only criticisms to the effect that LOGO is somehow delicient,—Ed., Those at you who saw last month's "Moraic Designa" know how spectacularly TI LOGO was defended on that count. This month Roger Ka finer responds to the first of Muller's ballenges, that a LOCO proponent 'write 11 LOGO procedures that perform wordprocessing functions on either a 40- or the olumn screen and printout in 40 or 86 We think you'll agree that Kirchner ably defends LOGO in this instance too, and we're hoping that he-or someone-will soon complete LOGO's exoperation with "on interactive graphics program that includes life access features."

By word processing we'w mean the creation and formating for output of a text document such as a letter. As those of you who ve worked with Tily word processor Til Vviller know having a screen with ewer than 80 columns is not initiation in the preparation of well formated output. What is important are good screen editing commands and the ability to easily format text for output only given specifications.

Documents are most easily created by using the built in TI LOCO editor. Since we are pointar ly interested in printing the documents we create and since TI LOGO can print only procedure definitions, the trick sito make "OCO hink we are de in any a procedure. The first line must therefore be TO procedure-name, where they entered by entering either ED To TO procedure-name. When BACK is pressed a procedure-name, with the text we have entered as body.

of LOGO's editor has excellen screen editing commands. Keys move the cursor up or down by times (UP DOWN) or within a line forward or back one space LEFT RIGHT) or to the beginning or end of the line (BECIN PROCEED). The character either under the cursor or behind the cursor can be deleted (DELERASE). Text from the cursor to the end

69



### Introduction

COCO Times is an information resource for anyone interested in participating in the creation of their own personal language one that will easily allow them to committenicate with a computer in a cotally new audiovisial realiti of applied imagination, exploration, and self-discovery. The articles on these pages concern the use of the new TLLOGO language, but readers do not need any additional software on equipment (or even a computer) to understand and learn from the material presented here.

If readers want to actually experience a TI LCGO environment, they will need either a TI-99/4 or TI-99/4A computer, the Expansion Memory peripheral, and TI LOGO Command Cartridge. A disk drive although convenient to have, is not required; a user's work may alternately be saved on cassette tape, printed out on the TI Thermal Printer, or hand copied into a notebook (for later re-keyboarding).

In each issue, one or more of the articles may reference or build upon the topics discussed in a previous article. It is therefore recommended that for maximum benefit and understanding, new readers obtain the appropriate back issues of 99 er Home Computer Magazine containing LOGO Times articles.

### NOTICE

LOGO Times is actively soliciting articles. Manuscripts should be typed double-spaced, and accompanied by a cassette tape or disk if containing any lengthy procedures or graphics.

Send all materials to:

LOGO Times Editorial Dept. 99'er Home Computer Magazine 1500 Valley River Dr., Suite 250 Eugene, OR 97401

All mail directed to the Letters to the Editor column (Letters on LOGO) will be published in accordance with the conditions set forth on 99 er Home Computer Magazine's Masthead page.

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LOGO Times is a trademark of Emerald Valley Publishing Co of the line can be deleted (CLEAR), and lines can be inserted, split, or combined by entering or deleting ENTERs.

Let's write a sample document and call it DOC:

THE NUMBER OF SCREEN COLUMNS ISN'T PARTICULARLY IMPORTANT IN TEXT PROCESSING, HOWEVER IT IS VERY IMPORTANT TO BE ABLE TO FORMAT OUTPUT FOR A GIVEN WIDTH TINE

REFORMATING OTHER
PROCEDURES ITS INPUTS ARE
THE OLD NAME
THE LINE WIDTH AND THE
NEW NAME
THE NEW NAME CAN BE THE SAME
AS THE OLD NAME
END

When we type in EDIT mode, we notice that we can continue typing without pressing ENTER until 127 characters have been entered. The text will simply wrap around. Words will be split arbitrarily, but that is a problem only at the output stage. In the example the lines are short, but they could have been as long as 127 characters. Notice too, that we have not indented. This is because LOGO doesn't allow indenting in procedure definitions (unless we use a non-space character for indenting).

Besides making the creation of a document easy, a word processor must make possible a format to any given specification for printing. A tull word processor such as IF-Writer allows much formating tlexibility. But because Muller's challenge is to format output to 40 or 80 columns, our main concern in TLLOGO will be formating the width. TI-Writer, of course, is not limited to those two options

REFORMAT is a procedure that will reformat a document to any width we choose. Its specification is:

REFORMAT oldprocedure-name width newprocedure-name. This reformats document oldprocedure-name so that

### Figure 1.

TO DOC25

THE NUMBER OF SCREEN COLUMNS ISN TO PARTICULARLY IMPORTANT IN TEXT PROCESSING, HOWEVER, IT IS VERY IMPORTANT TO BLABLE TO FORMAT OUTPUT FOR A GIVEN WIDTH LINE

REFORMATIS A PROCEDURE FOR REFORMATING OTHER PROCEDURES. ITS INPUTS ARE THE OLD NAME. THE LINE WIDTH AND THE NEW NAME, THE NEW NAME CAN BE THE SAME AS THE OLD NAME IND

TO DOC60

lines are filled to a maximum width of width and stores the reformated document as newprocedure name. Oldprocedure name and newprocedure-name can be the same.

For example, REFORMAT 'DOC 25 'DOC25 will reformat DOC to have at most 25-character lines and store the result as DOC25. And REFORMAT 'DOC 60 'DOC60 will reformat DOC to have at most 60-character lines and store the result as DOC60. The results are seen in figure 1.

REFORMAT also uses the other procedures listed below. These can be kept in a separate file and RECALLed when needed. A printed copy of the reformated document is obtained by saving it to a printer (Thermal Printer with TELOGO or an RS232 printer with TELOGO II). One will naturally not want to print the retormating procedures. The following procedure can be included with the others to erase unwanted procedures before printing:

TO CLEANUP
ERASE REFORMATI
ERASE REFORMATI
ERASE FLUSHBUFF
ERASE PUTINBUFF
ERASE LMPTYBUFF
ERASE LENW

TRASE CITANUP IND

How does REFORMA! work? REFORMAT uses the special primitives in EOGO for manipulating procedure definitions: TEXT and DEFINE. TEXT converts the text of a procedure definition into a list, and DEFINE converts a list of a procedure definition into a procedure. REFORMAT's job is only to pass the list representation of the input procedure definition to REFORMAT! and to take the output of REFORMAT! and convert it to a procedure with the name provided. The main work is done by REFORMAT!. The definition for REFORMAT! St.

TO REFORMATE INAME. LL. NINAME MAKE "T. TEXT :TNAME.

MAKE "T REFORMATT : LETTED [] OFFINE NTNAME T MAKE "T [] END

There are six inputs to REFORMAT1. The first two are the list of lines to be processed and the desired line width. The other tour are initial values for four local variables. The local variables are 1):CURL the list of words in the current line being processed, 2):BUFF, the words a ready processed for the next line of the reformated text, 3):BL, the width of the processed text in .BUFF, and 4):NTX1, the storilines processed so far. The definition of REFORMAT1 is:

THE NUMBER OF SCREEN COLUMNS ISN'T PARTICULARLY IMPORTANT IN TEXT PROCESSING. HOWEVER IT IS VERY IMPORTANT TO BE ABLE TO FORMAT OUTPUT FOR A GIVEN WIDTH LINE.

REFORMAT IS A PROCEDURE FOR REFORMATING OTHER PROCEDURES ITS INPUTS ARE THE OLD NAME, THE LINE WIDTH, AND THE NEW NAME, THE NEW NAME CAN BE THE SAME AS THE OLD NAME END BLACK GOLD—TRY YOUR LUCK IN THE OIL BUS NESS AND STOCK MARKET, SEE IF YOU CAN BECOME A MEMBER OF THE IDEE RICH FOR 1.4 PLAYERS, HIGH-RES GRAPHICS. AND SOUND EFFECTS

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TO REFORMATE: TXT :LL :CURL :BUFF :BL :NTXT

IF :CURL = [] THEN GO "2 MAKE "W FIRST :CURL MAKE "WL LENW :W

TEST :BL + :WL > :LL

IFT FLUSHBUFF

GO "1

IF :TXT = [] THEN EMPTYBULF OUTPUT :NTXT

MAKE CURL FIRST TXT
TEST :CURL = []

FT EMPTYBUFF FLUSHBUFF

MAKE "TXT BF :TXT GO "1

END

The idea is to consider lines of :TXT one at a time. The next line is made the value of CURL. The words in :CURL are put one at a time into :BUFF (with PUTINBUFF) until the length of :BUFF would exceed :LL. Then FLUSHBUFF empties :BUFF, storing its contents as a list at the end of :NTXT. An empty line in :TXT is understood to be a space between paragraphs. Then anything in :BUFF is removed to :NTXT by EMPTYBUFF, and FLUSHBUFF adds an empty line at the end of the :NTXT. Both EMPTYBUFF and FLUSHBUFF use the primitive LPUT which puts a list at the end of another list.

It must be admitted that although these procedures work, they are suitable only for short documents. I had some trouble with TI LOGO ''choking'' on longer documents. TI LOGO II should work much better because of its much larger

workspace.

REFORMAT proves that text formating can be done in TI LOGO and that it can produce good looking printed output. It you want to use a more flexible word processor, go into a procedure-oriented language having greater control over output—TI Extended BASIC, Pascal, or FORTH, for instance. But LOGO is a good language for thinking through solutions to problems, a language for learning—even about word processing.

### PROGRAMS SOFTWARE



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### LISTINGS OF THE REFORMAT PROCEDURES

TO REFORMAT :TNAME :LL :NTNAME MAKE "T TEXT :TNAME

MAKE "T REFORMATI :T :LL [] [] 0 []
DEFINE :NTNAME :T
MAKE "T []
END

TO EMPTYBUFF

IF :BUFF = [ ] THEN STOP

PRINT :BUFF

MAKE "NTXT LPUT :BUFF :NTXT

MAKE "BUFF [ ]

MAKE "BL 0

END

TO REFORMAT1 :TXT :LL :CURL :BUFF :BL .NTXT

I:

IF :CURL = [] THEN GO "2

MAKE "W FIRST :CURL

MAKE "WL LENW :W

TEST :BL + :WL > :LL

IFT I-LUSHBUFF

IFF PUTINBUFF

GO "1

2

IE :TYT | L L THEN GARTUR

IF :TXT [] THEN EMPTYBUFF OUTPUT NTXT

MAKE "CURL FIRST :TXT TEST :CURL = []

IFT EMPTYBUFF FLUSHBUFF MAKE "TXT BF :TXT

GO "1 END

TO PUTINBUFF MAKE "BUFF SE .BUFF 'W MAKE "BL 'BL + :TXT GO "T

END

TO FLUSHBUFF
PRINT BUFF
MAKE "NTXT LPUT BUFF;NTXT
MAKE "BUFF []
MAKE "BL 0
END

TO LENW :W

IF FIRST :W - :W THEN OUTPUT 1

OUTPUT 1 + LENW BF :W

END

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2 All entries must be postmarked no later than bept. 45 1983 All programs will be mailed two to three weeks after the entry date to ensure a fair start for all

 Each solution must be mailed to us with the correct answer to the mystery and the individual code number that will be displayed by your computer when the mystery is solved

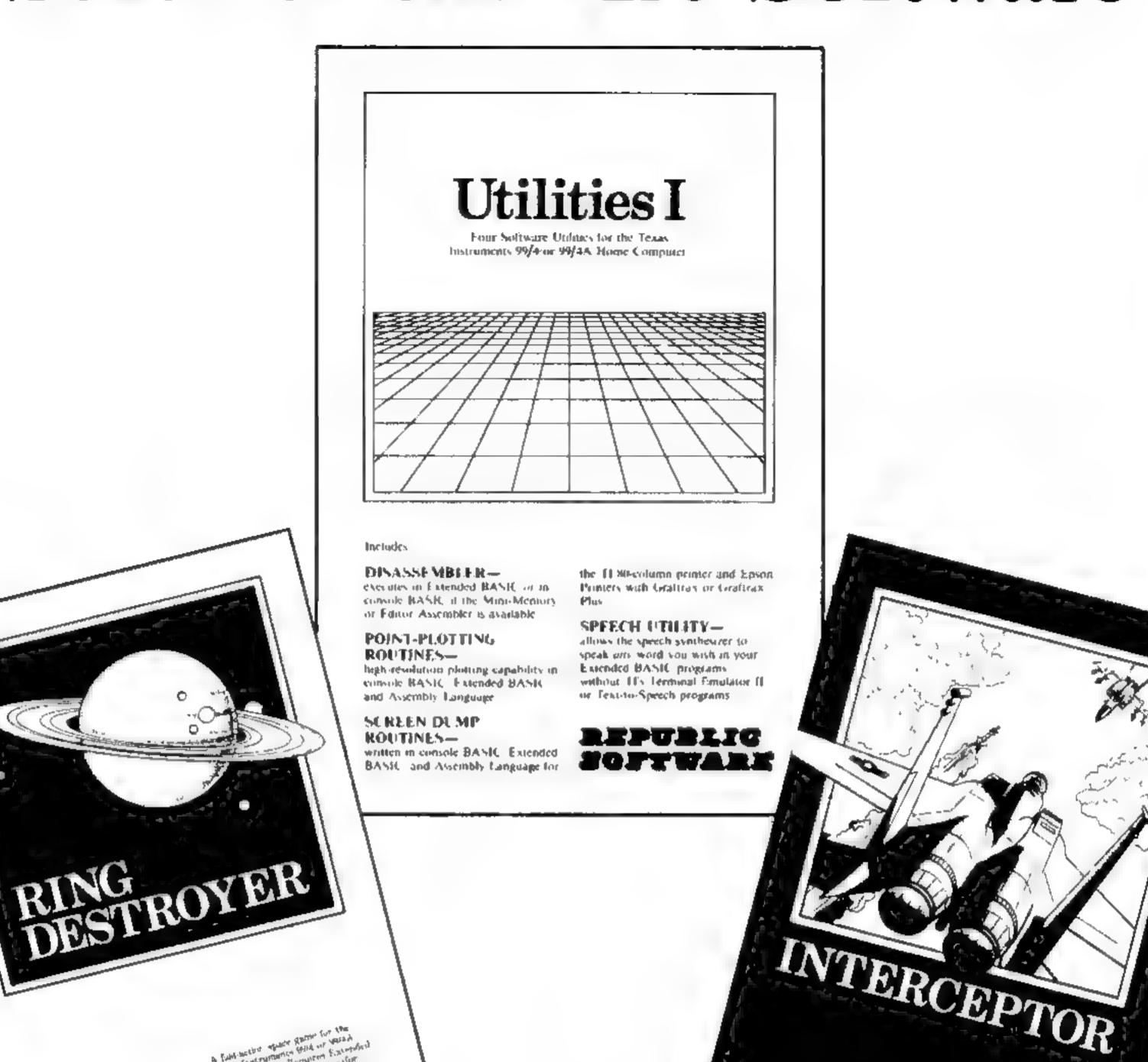
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5 In the case where your cassette or disc will not load or run, it may be returned in its original condition, within ten days of our mailing date for a full refund

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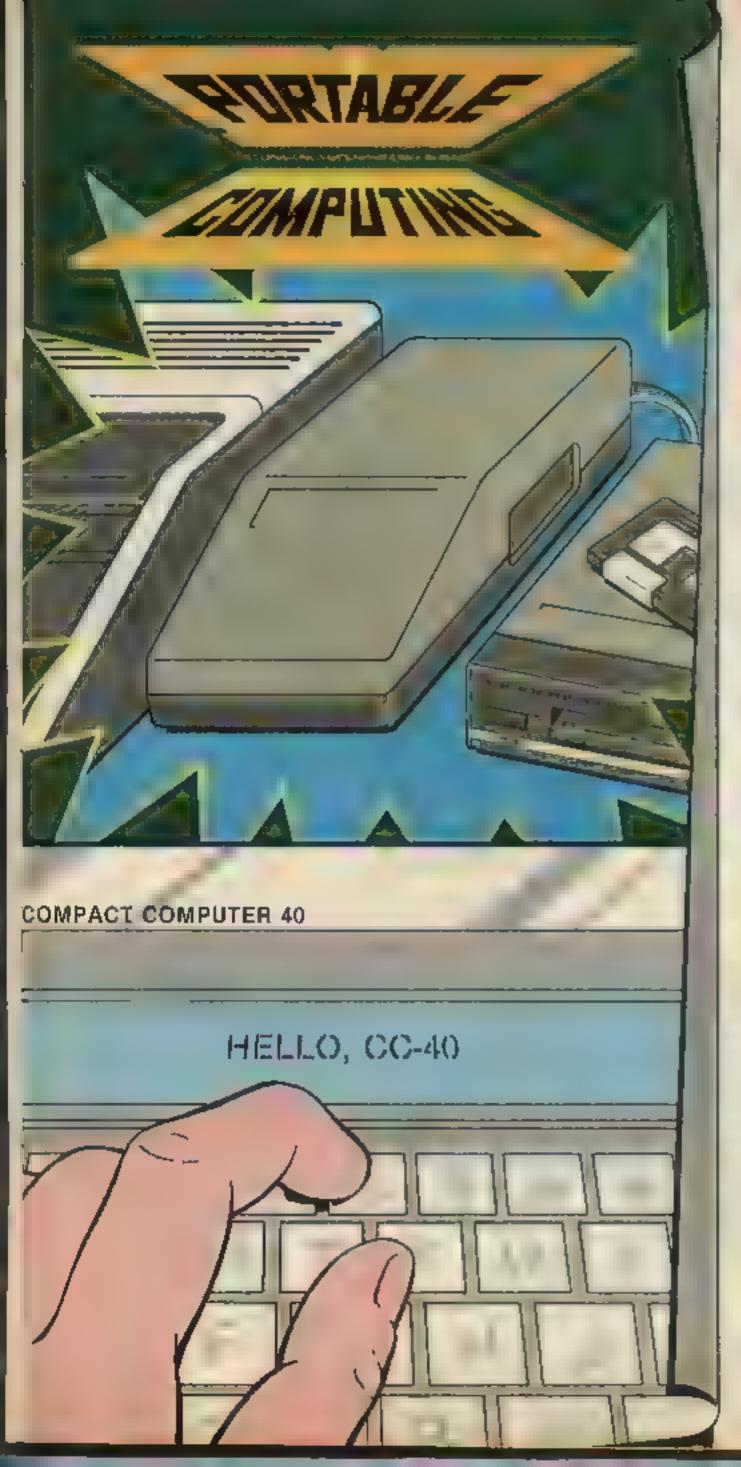
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### HELLO, LITTLE BROTHER!

By Robert Ackerman

4 5 6

THE C THE CHIPPETER THE REPORT OF STREET "We can the the "The inflored to c the and the second of the seco to the trans of the transfer of there was the text to come a be on the " in a state of the state of the an artiful day. A star fire a gift of the deion individually favorage in his higher the comme beautiful a feet in the which the property and the property it who is saidly the risk of the saidle in 10 1 7 5 7 1000 1 1 that the net make a total 21 17 5c c c c c 의 18가 나 가게 되어 나는 사람이 나를 가게 하는 것이 되었다. alal h was the white the to he the complete the second separate Consult by non surveyer to a state was recession to the for held a copy has a minimum the to get the second or second THE ROLL OF STREET STREET, MAKE HE could be a second of the second or s and by all control of the little 99 dA system of the late of th Risa on add by Santa R 1 a 4 3 4 5 4 4 5 5 6 6 17 17 116 Delivery to you all work I HALL MILE A S A S III "

The Hex bus Adapter

I we to be in and made w

P. C. CEST S. C. ICSC VVI when it I a start to the If not " of it by his the for it it is it Sale t Back or all Since Track the first As As A street to as sions east it is from the first the purished the total and the second F THE CAMPA HA & TANK THE SE tors, the same safety WHEN IS A THE DAY WHEN YOU IN NAME OF BRIDE STREET 44 4 p2 4 14 3, 444 14 4/24 3/4 14 I a sis in more to Win in a copyr ! 17 11 WI 2 4 3/4 4 4/8 47 THE A REPORT OF THE HAVE HOUSE OF A R. Blass properties of the part of the THE PARTY AND THE PROPERTY OF 15 19 14 1 1 7 4 1 1 1 1 1 1 1 1 1 1 1 1 1 Place to aspect to voy putt 14 COLD TO SEPTER A THE MAN HOLDER S TO TO INCX DESCRIPTION OF PRIVATE OF T Well and and the control of >>+ 141 (4 ( 4 of + )) 4 30 (+44 ) 17 F-4 upink depend of the fact of the total of manufaction the other place of the application avoided the maker of XB 5 This s here to make the his design them were to THE HERE I HAVE IT IN THE WARRENCE OF CAR SERVERSE KAP THE LOSE TOP only, rather than an alphanumeric designation like DSK1 or CS1. For instance, the first Wafertape drive is called simply 1. So to save a program from Extended BASIC on the 99/4A to Wafertape drive 1, the command would be SAVE HEXBUS.1. filename. Because the CC-40 has only the Hex-bus interface, HEXBUS is superfluous. The command to save a file to the first Wafertape drive from the CC-40 is simply SAVE 1. filename.

The Wafertape Drive

The wafertape recording medium itself is an endless strip of magnetic tape, and it always passes across the read/write heads in one direction only. In order for the drive to orient itself with regard to the tape, the tape has a reflective marker that serves as the end-of tape and beginningof-tape marker. When the drive needs to find this marker, which is its base reference point, this intelligent peripheral automatically advances the tape until the beginning-of-tape marker passes the read/write heads. From the information on the tape's directory, which is recorded immediately after the beginning-of-tape marker, the drive can then determine where any file on the tape is located and automatically advance to that location.

But even though finding a file requires only a single keyboard operation (and no reading of cassette footage counters, skipped commands in the cassette loading operation, etc.) to find a file, the Wafertape drives are not much faster than the cassette in actual tape transport. It takes about 15 seconds for a 10-foot tape to reach any location on the tape; it takes about a minute and a half on a 50-foot tape. In other words, it seems like an eternity for a 50-foot tape to find the beginning-of-tape marker again. The choice of wafertape involves a trade-off, just as the speed of flying may mean long waits at airports and time-consuming trips to and from downtown.

Physically, the Wafertape drive is much more convenient than a cassette drive. For one—thing, it—is—much—smaller—approximately 6 x 4 1/2 x 1 1/2 inches, or about the size of a ham sandwich. The tapes themselves are also smaller: about half the size of a cassette in any dimension. In addition, the Wafertape drive runs from the power of four penlight batteries or from a 6-volt transformer. This minimal power—requirement—coupled—with—its size—means that it's perfectly portable.

File Management on Wafertape

The hybrid parentage of the Wafertape influences its file management system. It has the organizational structure of a diskette—a directory with physical locations indicated on it—along with the physical structure of a cassette tape—a long strip of magnetic medium. The directory after the beginning-of-tape marker contains all the information about the location of the files on the tape. But the physical structure of the tape, coupled with the one-way operation of the drive, dictates that all files be sequential rather than relative—you can't back the tape up.

In addition, files are added to the tape in line, one behind the other. This has consequences for the uses of certain files, as well, according to the preliminary manual for the Wafertape drive. A tape can hold up to sixteen files, but the only one which can be closed and then reopened for output is the last one. Reopening any other file—that is to say, one somewhere in the middle of the tape—for output will cause the system to delete its present directory entry. It will then add a new directory entry which puts the reopened file at the end of the tape. In that case, the previous contents of the file are lost. This means that when you use wafertape to store a file which you will continually be updating that is, outputting to and inputting from—it must be the last file on the tape. Or the only file on the tape.

The process of setting up a wafertape for use is called formating, and is similiar to initializing a diskette. From the CC-40, the operation is extremely simple: You put a tape in the drive and type the command FORMAT, followed by a space and the number of the drive. Typing FORMAT 1 and pressing [ENTER] establishes the directory at the head of the tape on Wafertape drive 1. To format a wafertape from the 99-4A requires a slightly different pro-

Listing 1

(Output from 99/4A to Wafertape):

100 REM 4A2WAFER

110 OPEN #1:"HEXBUS.1.XCHANGE", SEQUENTIAL,OUTPUT,DISPLAY, VARIABLE 80

120 CALL CLEAR

130 LINPUT "MESSAGE?":A\$

140 PRINT #1:A\$

150 CLOSE #1

160 END

Listing 2

(Input from Wafertape to 99/4A):

100 REM WAFER24A

110 OPEN #1:"HEXBUS.1.XCHANGE", SEQUENTIAL,INPUT,DISPLAY,

VARIABLE 80

120 CALL CLEAR

130 LINPUT #1:A\$

140 PRINT A\$

150 CLOSE #1

160 END

Listing 3

(Output from CC-40 to Wafertape):

100 REM CC402WAFER

110 OPEN #1,"1.XCHANGE", DISPLAY,OUTPUT,VARIABLE 80

120 LINPUT "MESSAGE?";A\$

130 PRINT #1,A\$

140 CLOSE #1

150 END

Listing 4

(Input from Wafertape to CC-40):

100 REM WAFER2CC40

110 OPEN #1,"1.XCHANGE",

DISPLAY, INPUT, VARIABLE 80

120 LINPUT #1,A\$

130 PRINT A\$:PAUSE

140 CLOSE #1

150 END

cedure. You will have to run the following miniprogram:

100 OPEN #1:"HEXBUS.FORMAT

MEDIA.1"

110 CLOSE #1

120 END

(Note the space between FORMAT and MEDIA.) This accesses Wafertape drive 1 through the Hex bus Adapter and sets up the directory on the tape. In both cases, the use of the FORMAT command is analogous to initializing a diskette: All previous data on the medium is wiped out.

The Transfer Program

Now that you can format tapes from either system, the next step is to use them. While in Lubbock, we wrote and tested a series of short programs for the CC-40 and the 99/4A. These programs will allow you to: 1) write to the Wafertape from the 99/4A; 2) read from the Wafertape to the 99-4A; 3) write to the Wafertape from the CC-40; and 4) read from the Wafertape to the CC-40. Listings 1 and 2 are in Extended BASIC, which requires the Extended BASIC cartridge for the 99/4A; Listings 3 and 4 are in Enhanced BASIC, the resident language of the CC-40. These programs permit the the Wafertape drive to serve as an intermediary between the two systems. They are merely skeletons, which will get fleshed out for more comprehensive use in subsequent articles.

All the programs either create or look for a file called XCHANGE, and either write a string to or read a string from the file. Since the internal formats of the two computers are different, the file data type is DISPLAY, because DISPLAY codes the information in one of the universal standards: ASCII code. The length for all the files is common: VARIABLE 80. The files are, of course, SEQUENTIAL. You'll notice that SEQUENTIAL is not included in the parameter list for the CC-40 programs. That is the default, and the CC-40 won't permit the parameter SEQUENTIAL in its OPEN and CLOSE statements which access the Wafertape. Oddly enough, including it in the parameter list gives you a syntax error.

You'll notice some other syntax differences between statements in the two BASICs. The file numbers in Extended BASIC OPEN and LINPUT statements are followed by colons; in Enhanced BASIC, it's commas. And the command to print to the CC-40's display (line 130, Listing 4) has to have the PAUSE statement; otherwise, the display is erased so fast that you don't even get to see it.

These programs will undoubtedly start you thinking about ways to use the two systems together when all the components finally reach your dealer's shelves. With a few modifications, expansions, or alterations they will make the the 99/4A and the CC-40 into a very versatile team.

What we saw in Lubbock suggests to us that the CC-40 alone might be able to drive the 99/4A's Peripheral Expansion System, which opens up some interesting possibilities. In future articles, we'll take a look at this potential.



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PLATO COMPUTER-BASED EDUCATION

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# A Classic

t's official! PLATO, that bearded Greek philosopher and symbol of learning has Lemerged from behind the pillars of the Academy and is now using the Home Computer to impart his ideals to all who will

gather 'round his console.

Back in January of this year we introduced you to Control Data's PLATO and their concept of a living library of learning. At that time, PLATO was only for the few in government, big businesses and universities who could afford the output of large, expensive computers. Now, we will be able to let you share in our regular audiences with this knowlegeable master. We will use this space to keep you up to date on what's happening in PLATO's realm and beyond.

Our big news this month is that PLATO. the CAI curriculum of 108 courses, is now available to TI Home Computer owners! All you need in the way of hardware to help you become an enlightened PLATOnic scholar is:

- a TI-99/4A Home Computer
- a Disk Memory system
- Memory Expansion.

Add to this the PLATO firmware (PLATO) Interpreter Solid State Cartridge) and the PLATO Program Packages of your choice, and you'll be ready to absorb the wisdom of the ages.

The current PLATO software library for the TI includes instruction diskettes in two large groups: Basic Skills and High School Skills. The Basic Skills program packages (each at a suggested retail price of \$49.95) are written to instruct students in grades 3-8 in math, reading and grammar. The High School Skills packages (also \$49.95 each) cover math, practical reading, writing, science, and social studies. These packages are not just geared to young people from grades 9 to 12; they are also designed to help adults who want to study at home or prepare for the General Educational Development (GED) exam.

Although these packages are an educational value in themselves, the Survey Diskettes in three subject areas (math, reading and grammar) that come with the PLATO Interpreter cartridge (also at \$49.95) are an even more impressive bargain because they provide parents with a tool for guiding, understanding and even communicating with their children as their learning progresses.

Diagnostic Duo

Most parents want their children to have the best possible grasp of the basic skills as soon as possible. They are, after all, the foundation on which children build all of their future learning. PLATO provides parents; with a unique and well-considered double dose of diagnostics to give them all the information they need to place their children

# Learning System Tools For Student Assessment

By Sharyn Lyon

Technical Editor

in the proper skills subjects and programs. This diagnostic team, which unfortunately doesn't accompany most learning programs, is made up of a Survey Diskette and a Parent Ouestionnaire. The child works on the computer with one of the Survey Diskettes, taking short tests of 6 to 8 questions. The purpose of these Survey Disks is to familiarize the learner with the computer and to evaluate the student's skill level in order to help him select the appropriate PLATO courseware. The tests on the Survey Disks use multiple choice questions to measure the child's grasp of specific concepts. Each correct answer receives a one- or two-word reward (EX-CELLENT!), and each incorrect answer also elicits a short message (THAT'S NOT IT.) from the computer. But although the incorrect answers are identified, the test taker is not given the correct answer. It seems that this is a teachable moment wasted. Graphics are also omitted from these pro-

"When a child picks out the subject areas himself and decides to complete the survey test, he is really deciding for himself what he is going to learn and when he will learn it."

grams. With the exception of the Math Survey Disk for Basic Number Ideas, the questions are not enhanced by any graphics for clarification, entertainment, or reward. This omission may make learning and even understanding the question difficult for all except children who can motivate themselves, read and follow directions well, and be encouraged to continue the quiz by a one- or two-word reward for a job well done. Although this Survey Disk program does not instruct the child during the test. each question has a corresponding program on the teaching disk with which the child can learn what he needs to know in order to master the concept.

The Survey Disks are used in combination with the Parent Questionnaire because parents and children need to function as a team for optimal learning. While the child works on the Survey Disk, the parents fill out the Parent Questionnaire which asks them what they think the child's capabilities are. The questions are skill-specific, like this one from the Math Parent Questionnaire which doesn't ask just whether the parent thinks the child can "borrow" or "carry" but—

CAN YOUR CHILD FIND THE DIFFERENCE IN THE SENTENCE 72 - 8?

Responding to questions like these gives parents an opportunity to sit back and reflect on what their children really can do. Rarely do parents have a chance to think so specifically about who their children really are and how they, as educational guides, can help their children get where they need to be academically.

Even with a pause to think carefully about responses, the questionnaire can be filled out in a short time since there are only from 2 to 5 questions for each program package. The time spent filling out the questionnaire is well spent because the parent or teacher acquires a maximum amount of usable guidance information about the child with a minimum of effort.

### Where Do We Go From Here?

Once the child and parent have completed their respective surveys, they should record scores and answers on the Survey Scores Sheet included with the Parent Questionnaires. This page, which may be duplicated for repeat use or for responses and scores for a different child, provides a place to record parents' answers to the questions in terms of "Yes, No, Don't Know," and the child's score in terms of the number of correct answers on the survey quiz. The page also shows the "suggested" scores for each quiz and provides a column in which to indicate whether or not the child, based on a comparison between his survey score and the suggested score, needs to work on the corresponding program package. In the following example (Figure 1), the parents have recorded their ideas of the child's capabilities, and then compared them with both the child's actual test performance and the score PLATO thinks that the child should attain. The parents have correctly marked that their child does not need to do this Numbers 0-9 and Numbers 10-1000 package.

The information here is valuable now and will be even more so later on when the child has completed more surveys and teaching disks and may have reached his

# Figure 1 RESPONSE SURVEY SCORES PACKAGE NEEDED Yes No Don't Know Your Child's Score Suggested Score Yes No X X 6 X

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frustration level. At that point it could be helpful to take the child back through one of the programs which made him feel successful. Thumbing through the Survey Scores pages, a parent can quickly and easily pick out likely programs to review in order to replenish confidence and enthusiasm. In this way, the child doesn't lose faith in himself and his abilities.

**Everything In Its Place** 

The Survey Disks and Parent Questionnaires reflect the tremendous amount of thought and research that PLATO's creators and developers have put into their learning program over the past twenty years. The concept presentation is carefully overlapped so that ideas are subtly reviewed throughout the Survey Disks and courseware. The questions build logically upon each other, adding one basic new detail to the concept at a time. The student who follows this progression moves gradually through one thought and on to the next.

The documentation is another strong point of the PLATO system. Everything from powering up your computer and loading the courseware to "Guidelines for Success" is easy to find and clearly presented —complete with diagrams and pictures of selected screens. A dedicated and capable sixth grader could conceivably follow the documentation independently and learn a bit about how the TI system works while he is learning from the PLATO activities. The on-screen instructions are clear, in a contrasting color block to make sure the user will see, read, and

follow them. Following the instructions may not, however, be so easy for young users or any user who is not a very good reader.

Although the Basic Skills program claims to be designed for third through eighth graders, fourth or fifth grade might be a better starting age. The reading proficiency needed to understand how to progress through the program and even how to answer individual questions is beyond what is currently considered third-grade level. The second screen in the Basic Number Ideas Survey, for example, looks like this:

HOOSE THE SYMBOL THE LETES THIS SENTENCE. 15 ? 11	11 2201 00111	And the
15 ? 11		A. 1845
		****
A. > (IS GREATER THAN	ð	1
B. < (IS LESS THAN)	•	· 9000
C. = (IS EQUAL TO)		1 m
TYPE A, B, OR C.		5.5
		1
The grand thristian definition	weggyd byggen a	-
	C. = (IS EQUAL TO)	C. = (IS EQUAL TO)

Besides being able to read (sound out) the words, (some of which would be more than a challenge to many third graders), the user must understand the specific meanings intended here for words like "symbol" and "sentence." If the user has not been taught the concept of a number sentence and/or doesn't understand the use of the word symbol, he could very well answer the question incorrectly even if he knows the correct answer. The student could end up being placed in a course that would not challenge him because he didn't know the jargon used in the survey question. Perhaps that question could be modified to read:

CHOOSE THE ANSWER BELOW THAT BEST FITS IN THE BOX.

15 - 11

The Math Survey Disk from which the example above was taken will assess the student's conceptual levels in nine general areas that appear on the menu: Basic Number Ideas; Addition; Subtraction; Multiplication; Division; Fractions; Decimals; Ratio, Proportion and Percent; and Geometry and Measurement. These nine headings represent over one hundred hours of teaching activities. However, it is inconvenient to go from the middle of a Survey Test in one area back to the Menu. Instead of being able to press [FCTN] [9] to go back to the Menu, you must press [FCTN] [=] and go all the way back to the master title screen. User beware.

The student is placed in a courseware area to work with a program disk when his score is less than the suggested score printed for that test on the Survey Scores Sheet, PLATO wisely leaves the handling of this delicate placement moment up to the parent or teacher. The computer docs, however, play a part in setting the moment up. As soon as the computer realizes that the student can not attain the suggested score, it interrupts the survey test with this non-threatening screen:

78 99'er Home Computer Magazine

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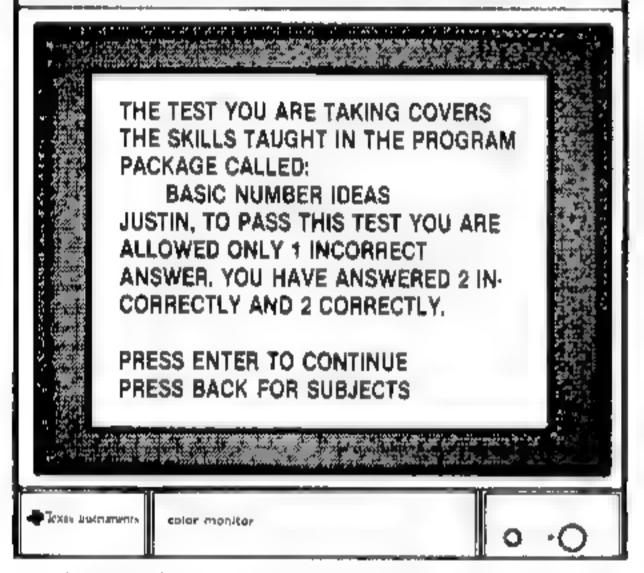
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If, at this point, the student wants to go on with this test even though he cannot pass it, he may do so by pressing [ENTER]. Another screen will then prompt him to record his score when he finishes this test. If the student wants to escape the embarrassment of a low score, however, he may press

[BACK] to go to the Menu and select another subject.

At the time of placement, the parent or teacher may need to explain to the student why he is going to work with a certain PLATO course. Rather than saying that it is because the student got too many answers wrong, the parent might say the same thing in a truer and more positive way. Actually, when a child picks out the subject areas himself and decides to complete the survey test, he is really deciding for himself what he is going to learn and when he will learn it instead of following someone else's curriculum plan. I think Plato would have liked the way the ideal of individualized education is alive and well in the learning system that bears his name.

With the placement phase completed, the student is now ready to explore a specific PLATO course. Next time we visit the Academy we will join a young scholar as he delves into some of the courses in the High School Mathematics series.

### Educational Activity Review Criteria

Documentation—rates the printed matter that comes with the activity. It notes whether the instructions are clear, comprehensive and easy to use, and whether the machine configuration requirements are spelled out, and looks for such information as how to load the program, use the keyboard, and restart the activity.

Independence—focuses on how complicated it is for the user to understand the steps needed to progress through the learning activity. It measures to what degree the activity may be done by a user and the computer alone without parent/teacher guidance. Whether the actual reading level of the activity is appropriate for the suggested grade level is another major concern of this rating category.

**Rewards**—rates the audio-visual rewards as to their motivational effectiveness and appropriateness to the activity.

**Graphics** rates the quality of the graphics and whether they enhance or detract from the educational purposes of the activity.

Concept Presentation—focuses on whether the concepts are presented clearly, in logical order and in enough depth for the learner to be able to apply learnings from the activity to other situations.

### PLATO Math Survey Diskette \$49.95 suggested retail price

Poor Fair Good Excellent
Documentation
Independence
Graphics'
Rewards'
Concept Presentation

'These categories will be used primarily to evaluate the courseware. Whether or not they should be used to rate the Survey Diskettes is debatable.

System Requirements: TI-99/4A Home Computer Disk Memory System Memory Expansion PLATO Interpreter Cartridge



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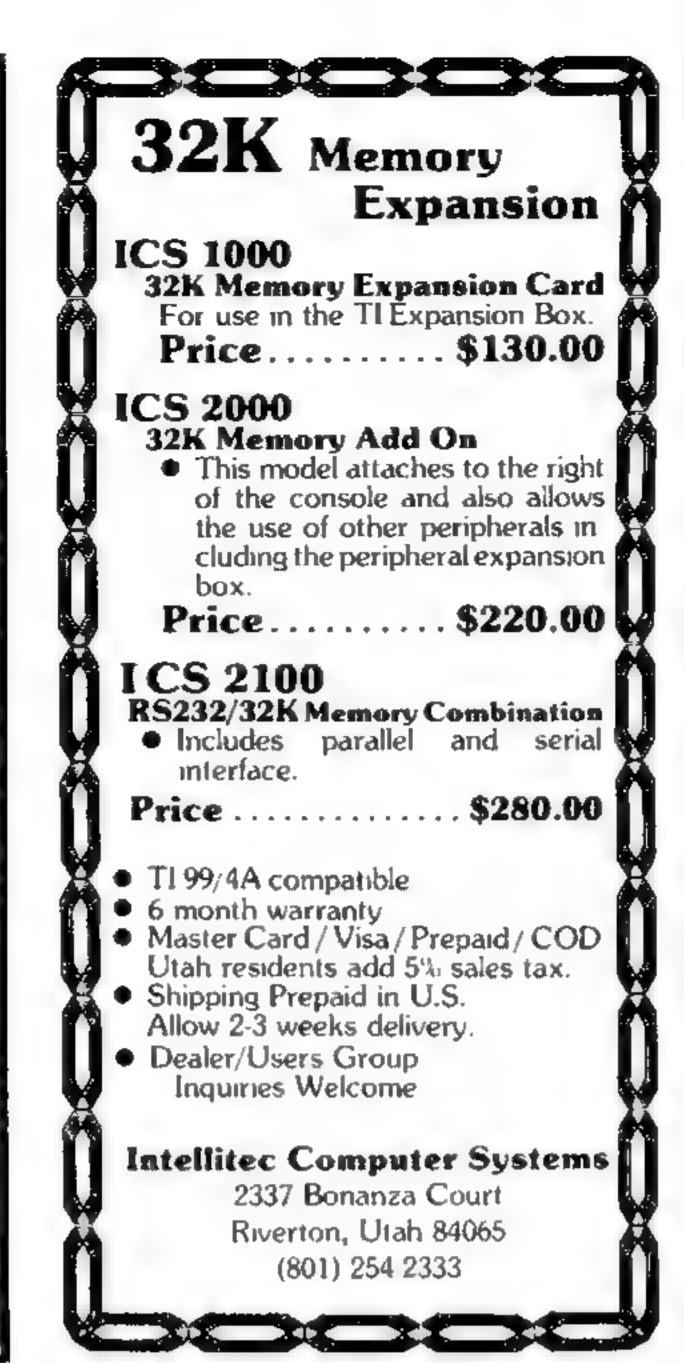
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### Starprobe . . . from p. 36

its way through one of two narrow openings and then through a geometrically regular maze of Xyolian construction. Along the way it will encounter fuel depots and ammo dumps, then in the lowest part of the cave defensive laser installations that must be destroyed before it can reach the bottom.

You have two types of weapons-QuasiThermite bombs and the SuperBeam. The QT bombs are effective against ammo dumps and fuel depots but have no effect on walls or laser machinery. The S Beam is much more powerful, destroying anything in its path, but uses a great deal of precious fuel and ammo-so use it only when absolutely necessary. Hovering and firing the S Beam use up your supplies, but you can replace your limited fuel and ammo by destroying the Xyolian fuel depots and ammo dumps with the QT bomber. The 5 Beam completely annihilates, so it can't be used to salvage fuel or ammo. A Pause key allows you to freeze play and also monitor your depth, fuel, and ammo.

Starprobe 99 opens impressively with three-dimensional monolithic title letters. Less impressive are the screen instructions which follow and the screen displays of running score and amounts of fuel and ammo left. These purple letters on a black screen are difficult to read

at best. Perhaps this is not a problem on the author's color TV, but for use on a TI monitor, a different color combination would have been more appropriate.

This unpromising feature is more than offset, however, by the colorful renderings of cave and maze featured in the game's successively difficult levels of play. The game starts at an encouraging level for beginners, and the varied obstacles in succeeding levels of play prevent the game's becoming tedious.

The game makes excellent use of vertical scrolling to give the illusion of descent. The graphics and colors are eyecatching, although the self-generating maze close to the "bottom" of the Xyolian cave needs to be more sharply defined. The "play again" routine is swift, for almost continuous play.

We found though, that the starprobe is sometimes slow to respond to the keys. Although the rate of descent (scrolling) is easily controlled via the hover-thrust key, movements to the left or right can seem rather laborious, and at times the slow response results in what seems like an unfair explosion (you lose!) of your starprobe. This is the most frustrating aspect of the game. You find yourself frantically pushing a key while your oblivious probe continues to drift down to crash against a wall or into the path of a Xyolian laser.

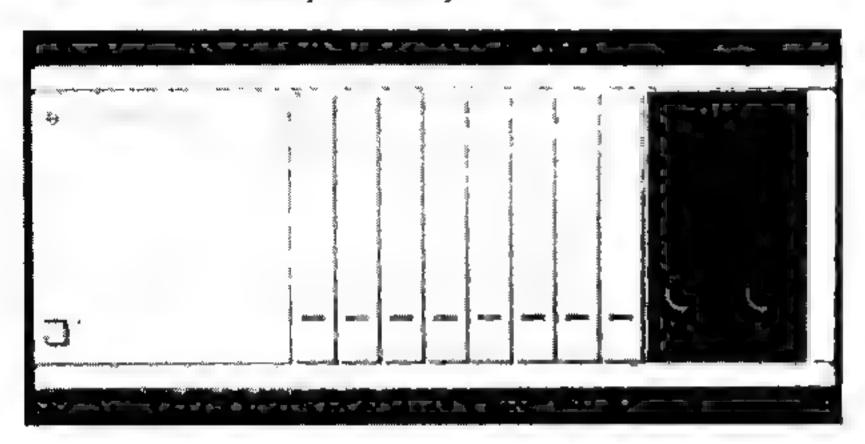
And while we're quibbling, we might mention too that ammo dumps and fuel

depots seem indistinguishable from one another. A player can't tell if he's restoring his fire capability or his ability to hover. The documentation is not too helpful on this point. At one point it offers the caveat, "Part of the enjoyment in a game of this type comes from the gradual discovery of the 'hidden' rules of the game." This may be true of some aspects of the game, but we would have appreciated documentation that explains how we might detect the difference between fuel depots and ammodumps and some account of what that attractive, self-generating maze encountered at the nethermost depths of the cave might be. The objective, of course, is to go as deep as possible (5,000 M is a decent score), but the unexplained objects encountered along the way leave players feeling rather mystified, and it all seems rather inconclusive.

Despite the rather sketchy documentation and occasional lapses in performance, Starprobe 99 is engrossing. The graphics are interesting, and the graduated levels of play keep the player at the keyboard. The game is a good example of the triumph of process over product; that is, players get so absorbed in the various levels of play that they don't really mind having only a vague idea of the scenario and ultimate objective.

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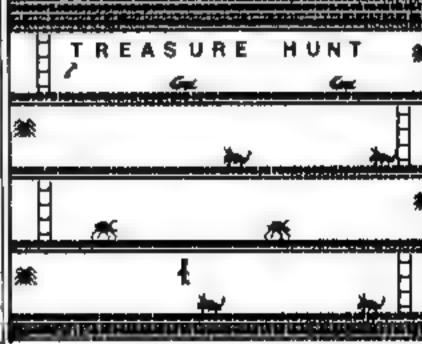
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DISK DBINES DISK DBINES

# By S.T. Holl

8215 Clifton Farm Ct., Alexandria, VA 22306

ood day to all of you artists, latent and otherwise! Welcome to the dynascape studio.

A dynascape, as I am sure you are all aware, is a landscape or seascape or cityscape which grows or changes or contains some sort of movement. This month I am pleased to be able to present a short 50-statement dynakit by a renowned dynascape painter, Trompe l'Oeil, along with an explanation. All you will need to complete this kit is your TI-99/4A computer and a color TV or monitor.

Today we are going to create a sunrise, complete with morning twilight and the rising sun. I will present a series of T! BASIC program lines which you can enter as you read along. The sunrise develops a bit at a time, and we will be able to see some of the mechanisms at work after just a few lines. The places where you can run the program and check your progress are marked RUN following the program lines. I will explain the underlying gears and cogs as they are installed; if clockwork interests you, then follow along. Of course, you might enjoy customizing the kit as you go. but if you are simply interested in the panorama, then type in the lines as they appear.

Starlight, Star Bright

We shall begin with the darkness before the dawn. Turn the computer on, select TI BASIC or Extended BASIC if you have that, and enter these lines:

150 DATA 32,42 160 READ SKY, STAR 170 CALL CLEAR 180 CALL SCREEN(2) 190 CALL COLOR(1,2,2) 200 CALL COLOR(2,16,2) 250 CALL HCHAR(23,1,SKY,32) 260 CALL HCHAR(23,RND\*30+1, STAR,1) 270 PRINT: 290 GO TO 250 RUN

There you have the starry night scroll ing up the screen. Not bad for a mere tenlines, is it? While the stars are rolling past. let us reflect a bit on what we have done and how we are going to proceed

The dynascape painter's paletté is his assignment of foreground and background colors to the 16 character sets; a CALL COLOR statement is the equivalent of squeezing a dab of paint from the tube. The brushstroke styles are the ASCII characters plus the characters reconfigured with the CALL CHAR command. Painting a brushstroke on the screen is done with CALL HCHAR and CALL VCHAR statements



In the program segment we now have running, we have established color set 1 as all black (statement 190) and set 2 as white on black (statement 200). Lines 150, and 160 give the variable SKY a value in set 2. Conveniently, the \* character, number 42, is in set 2. Line 250 paints a streak of black across the bottom of the screen and line 260 puts a star some random place in it. Line 270 scrolls the screen upward. By the bye: We will make lines 150 and 160 do quite a bit of additional work for us before we are through, so if you haven't mastered the EDIT mode for changing statements instead of having to retype them completely, then perhaps this is the time to read over that part of your BASIC manual.

Stop the program now with the CLEAR command [FCTN] [4]. To get the program to move on to the next stage after a modicum of night sky, convert that endless loop into a FOR loop with these statements:

240 FOR DARK = 1 TO 50 290 NEXT DARK

The old line 290 disappears automatically when the new one is entered, and of course you can enter new lines in any order and the computer will ensure that they are placed in numerical order.

Calling All Colors

We would like the black sky to gradually fade to grey—color 15. We'll start with modifications of 150 and 160 and then add a few more lines:

150 DATA 32,42,2,3 160 READ SKY, STAR, FGC, CHSET 300 BGC = FGC310 DATA 15 320 READ FGC 350 CHSET = CHSET + 1 380 CALL COLOR(CHSET, FGC, BGC)

Line 380 actually adds the dab of color to the palette; in it, FGC and BGC are foreground and background color variables, and CHSET is the character set. We have added initial values of FGC and CHSET to the initial DATA and READ statements, and then we have arranged for the current foreground color to be transferred to the background (line 300) and for a new foreground color to be read (lines 310 and 320). Line 350 bumps the character set number up to the next one.

Now to plan our brushstrokes. We will strive for an Art Deco effect by introducing our next color as a series of horizontal lines across the bottom of the screen, each, broader than the last. There are 64 dots. or 'pixels,' in each character the TI-99/4A displays. These picture elements are arranged in eight rows, and the pixels in a given character can be set to show either. the foreground or background color by using the CALL CHAR routine. The details are in your language reference manual, but for the moment you only need to know that CALL CHAR(SKY,"00000000 00000000") specifies a solid square of background color and CALL CHAR(SKY, "FFFFFFFFFFFFFFF") specifies a square of the foreground color. By mixing the F's and 0's we can mix the two. We will mix them two symbols at a time, since two of them correspond to one row of pixels. Here is the code:

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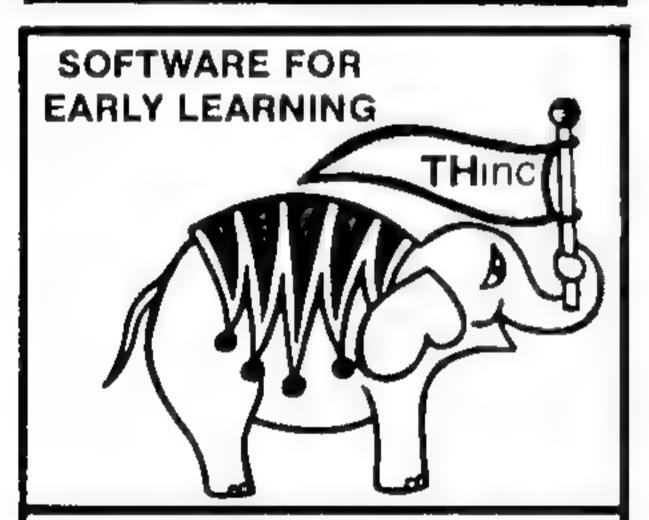
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430 SKY = (CHSET + 3)\*8 + EIGHTH = 1 440 CALL CHAR(SKY,PATTERN\$) 450 CALL HCHAR(23,1,SKY,32)

540 PRINT :

560 NEXT EIGHTH RUN

That's the ticket, except that the dawn comes more slowly in my neighborhood. We'll fix that later on.

What colors come after grey? I think pink on grey gives a marvelous effect—then deep yellow perhaps, a delicate touch of green, and then the blues. Here are the corresponding color codes, followed by a zero, in our color data line:

### 310 DATA 15,9,11,4,5,6,6,6,6,0

The zero signals the end of the string of color codes provided. The following code will take advantage of that signal to become an endless loop on the last color:

330 IF FGC<>0 THEN 350 340 GO TO 340

### Somewhere Over the Rainbow

We would like to be able to put an arbitrary number of colors in data line 310, so let's add a flourish which will enable us to reuse character sets:

360 IF CHSET < 7 THEN 380 370 CHSET = 2

And we will need this to complete the loop:

570 GO TO 300 RUN

You will, I am sure, want to run this several times, adjusting the colors in the data line until the sequence suits you.

Now, how about the sun? We will generate a yellow character set for that, using this dab of paint:

### 210 CALL COLOR(8,11,11)

We will also add a bit more to lines 150 and 160 to define the variable SUN as well as several more variables. We will need:

150 DATA 32,42,2,3,88,6,0,0,0 160 READ SKY,STAR,FGC,CHSET, SUN,SUNRISE,SUNHI,ONN,OFF

When the color of the sky first matches the color code in SUNRISE, the sun will begin to rise. Line 390 will make this check; if there is a match, the program sets ONN to 1 in line 400. The clockwork will operate until a sun of size SUNHI appears, and then the value of OFF will be changed from 0 to 1 also, providing the signal for the sunrise mechanism to be ignored thereafter. I have set the SUNRISE signal to be dark blue (6).

390 FGC<>SUNRISE THEN 410
400 ONN 1
460 IF OFF + (1 ONN) THEN 540
470 SUNHI SUNHI + 1
480 SWIDE SUNHI
490 IF SWIDE<5 THEN 510

500 SWIDE = 9 - SWIDE

510 CALL HCHAR(23,17 SWIDE, SUN,2\*SWIDE) 520 IF SUNHI < 8 THEN 540 530 OFF 1 RUN

### Here Comes the Sun

There we are —a bit more cubist that I ordinarily prefer, but it'll do.

Now I promised we would adjust the speed a bit. Here is what we will use:

280 GOSUB 580 550 GOSUB 580 580 FOR TICK = 1 TO 100 590 NEXT TICK 600 RETURN RUN

Adjust the value of the upper limit to line 580 to vary the quickness of the day. Voila! The dynascape kit is complete. There is an entire listing following this article. Next time you visit the studio we'll see what dramatic add tions we can make when we write this in Extended BASIC. Of course, no masterpiece (or program) is ever complete while the artist is still alive; you can continue to touch this up when the fancy strikes for as long as you live . . . So key in, and rise and shine. It's a good day for programming!

\* POCKET SUNRISE | BY S. T. HOLL 1 W REM 130 FEM REM 99 ER VERSION 2.10.1 150 DATA 32,42,2,3,88,6,0,0,0 READ SKY, STAR, FGC, CHSET, SUN, SU NRISE, SUNHI, IONN, OFF LIN CALL CLEAR LINE CALL SCREEN (2) 190 CALL COLOR(1,2,2) 200 CALL COLOR (2, 16, 2) 21 M CALL COLOR(日, 11, 11) **空型的** FG **== "FFFFFFFFFFFFFFFFFFFFFF**" 236 BG\$="00000000000000000" FOR DARK=1 TO 50 EALL HOHAR (23, 1, SKY, 32) CALL HCHAR (23, RND#30+1, STAR, 1) PRINT : 280 GOSUB SB0 MEXT DARK 300 BGC=FGC 310 DATA 15, 7, 11, 4, 5, 6, 6, 6, 6, 6 「BY READ FGC | IFI FGC< >el (THEN 350) 346 60 TO 340 **ご告報** ICHSET=CHSET+1 | IF ICHSET<7 THEN 3日の STO CHSET=2 SHO CALL COLOR (CHSET, FGC, PGC) STO IF FECK SUNRISE THEN 410 Mining Fight E1GHTH=1 Tid 19 PATTERNS-SEG\* (FG&, 1, 2\*EIGHTH) & SEG# (8G# 1 2\* (8-EIGHTH)) ESKY=(CHSET+3) \*8+EIGHTH-1 CALL CHAR (SKY, PATTERNS) #50 CALL HCHAR (23, 1, 5KY, 52) 460 IF DFF+ (1-DNN) THEN 540 #70 SUNHIESLINHI+1 SWIDE-SUNHI MERMIF SWIDE(5 THEN 510) SWIDE=9-SWIDE BIB CALL HCHAR (23, 17-SWIDE, SUN, 2\*S WIDE) 520 IF SUNHICE THEN 540 538 OFF=1 SAB PRINT : BEG GDSUB 580 BAO NEXT EIGHTH STE GD TD 300 500 FOR TICK=1 TO 100 STO NEXT TICK AND RETURN



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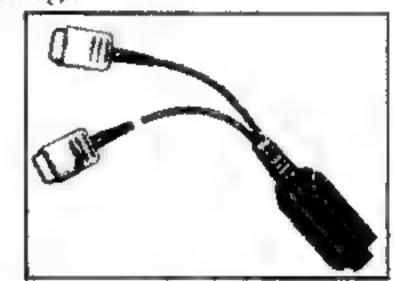
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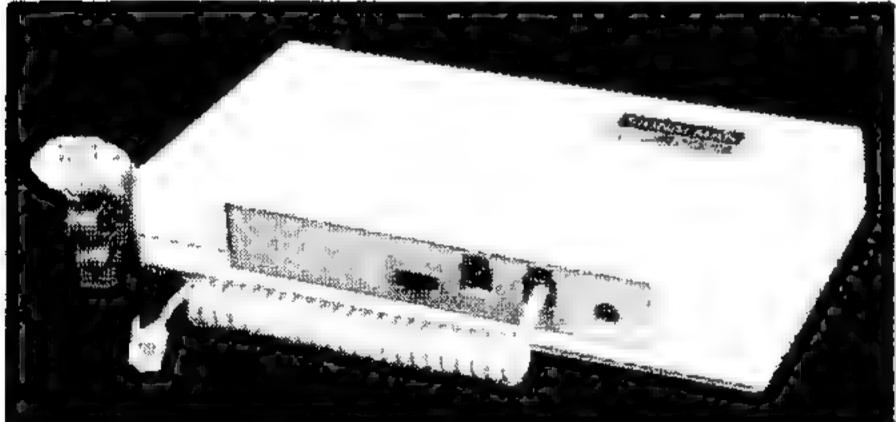
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By David M. Douglas

45-226 Nakuluai St. Kaneohe, HI 96744

It can be difficult, if not impossible, for administrators of large institutions to keep in touch with the people they are trying to serve. The chancellor of a large university may never speak with an undergraduate. The police commissioner doesn't have time to chat with the cop on the beat. To remedy this situation, the large hospital where I work has taken steps to keep in touch with the needs of its patients. We use written questionnaires to routinely survey the attitudes of patients toward the quality of service they receive from the staff. In this article we will look at some strategies for developing these questionnaires and methods for tallying and evaluating the results.

The questionnaire in Figure 1 is similar to one used in the hospital's Optometry Department. Hand-tallying a set of 200 to 300 questions can be very tedious, so when we purchased a microcomputer, I developed the program listed here for computer tallying of questionnaires.

Because the questionnaires used in the hospital vary from one department to another, the format had to be fairly general. So it should be possible for almost any business or organization to use the listings as they are. The format is compatible with either disk- or cassette-based systems (I had a disk system at work, but most of the writing was done on my home system with cassette only). Considerable effort was made to make cassette storage as efficient as possible.

The first step was designing the questionnaire. This program permits only one answer per question. Answers should be indicated by checking a box, circling a number, or any other method that produces a single defined answer. Each answer is assigned a number, which is printed on the questionnaire form. When tallying the questionnaire on the computer, the operator enters the number of the answer indicated by the respondent.

Since people have a habit of not following directions, decide what you'll do if someone checks two or more answers to one question. One alternative is to assign priorities to the answers, arrange them in order of decreasing or increasing priority, and then enter either the first or the last one checked. Or you could choose to count that question as a blank answer (the option we used).

The program presents a menu with four options: setting up and storing the questionnaire, entering and storing the responses, printing the results, and exiting the program. The three activity options may be done all at the same time or separately, but they must be done in sequence.

Selecting the first option and following the input prompts, the operator enters the questionnaire title, questions and answers. (Note that if any of these contain commas, they must be enclosed in quotation marks to avoid an entry error message.)

The computer prompts the operator with each question, and the operator enters the number of the answer checked on the form. The computer checks to see if it's a valid answer number for that question and beeps if there is an error. If the answer was left blank when something should have been checked, or if the operator cannot tell which answer is indicated, he/she enters a zero (0). On the printed reports these will be tallied as BLANK answers. For some questions, such as question #8 in Figure 1, the answer is supposed to be left blank. For these the operator enters 111 to "skip" that question, and no answer will be tallied. If an answer is designed to terminate the questionnaire in the middle (such as a no response to question #5), the operator enters 999 for the answer to the next question, and the program will skip all the remaining questions for that form.

the program will skip all the remaining questions for that form.					
QUALITY OF SERVICE PROGRAM - PATIENT SATISFACTION QUESTIONNAIRE  Dear Patient:  Our records show that onyou visited our Optometry  Department, Please help us measure and improve our service by  taking a few moments to fill out this questionnaire, Your answers					
will be kept confidential, and a pre-addressed, stamped envelope is provided for you to return it to us. If you have any questions, please contact the Clinic Supervisor, phone 555-0808. Thank you for your assistance.					
1. From the time you first contacted us for this appointment how long did you have to wait for an appointment time?					
Same  Day 1 day 2 days 3 days 4 days 5 days 6 days 1 week  1 2 3 4 5 6 7 8 6					
2 weeks 3 weeks 4 weeks 5 weeks 6 weeks 7 weeks 8 weeks 8 weeks 9 10 12 12 13 14 15 16 1					
2. For this kind of visit, what do you think is the longest time you should wait for an appointment?					
Same Day 1 day 2 days 3 days 4 days 5 days 6 dass 1 week 1 2 3 4 5 6 7 8					
2 weeks 3 weeks 4 weeks 5 weeks 6 weeks 7 weeks 8 weeks 8 weeks 9 10 11 12 13 14 15 16 16					
OVERALL, how would you rate the service you received during the visit, by:					
3. Receptionist  1 2 3 4 5 4. Optometrist  1 2 3 4 5					
5. Did you visit our Optical Dispensing Department?  1					
Please answer the following questions only if you visited our Optical Dispensing Department.					
6. The selection of frames was:  Very Good Good Fair Poor Very Poor  1 2 1 4 1 ;					
7. Did you feel the prices for frames were:  Very  Reasonable Reasonable About Right High High  1 2 3 4 5					
8. If you purchased glasses, did the delivery time seem:  Very Fast Fast About Right Stow Very Slow					
9. OVERALL, how would you rate the service you received from Optical Dispensing?					
Very  Excellent Satisfactory Satisfactory Unsatisfactory  1 2 3 4 5					
Figure 1					

**Tallying Responses** 

Note that as the responses are entered, the program converts the numbers to letters (0 becomes A, 1 — B, etc., and skipped questions — @). This produces a compact string that can be stored efficiently even on cassette. For example, the question naire in Figure 1, with 9 questions, will be stored with 19 forms per record. After all the answers to a form are entered, the operator is given a chance to correct any entry errors. When the answers have been accepted, a prompt line asks if there are more forms to be tallied. Since 99% of the time the operator



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will want to accept the answers without correction and go on to tally more questionnaires, the program accepts a null entry (pressing the space bar only) as well as Y to indicate yes for these two prompts. Periodically, the computer stores the answers to disk or cassette; this reduces the load on RAM memory, and it is valuable to have the answers stored in case you want to do other types of analysis later on.

If you want to count multiple answers to one question, you can use the 999 and answer correction options. Tally one answer as usual. When the computer asks for answers to the next questionnaire, enter 999 as the answer to the first question. When asked to accept the answers, type N for no, and enter the number of the question with multiple answers. Then enter the

number of the next multiple answer.

Last is the print section. If it has already been entered in a previous session, the questionnaire is loaded in from disk or cassette first. (If the questionnaire was loaded in during the response entry, it must be loaded again.) Then the response file is read and tallied, and finally the results are printed out. By adding one or two program lines, specific "profites" can be printed. For example, to analyze how persons who responded "Unsatisfactory" or "Very Unsatisfatory" to question #9 answered other questions, add this line:

### 1365 IF SEG\$(R\$(J),9,1) < "E"THEN 1400

Now the printed tally will include only people who answered "Unsatisfactory" or "Very Unsatisfactory" to question #9.

After the tally summary is printed, the operator may select any two questions for a cross-tabulation. (This is one of the most tedious tasks in manual tallies.) For example, suppose you are interested in knowing how many people had to wait longer for an appointment than they considered reasonable. This can be determined by cross-tabulating questions 1 and 2. Any number of cross-tabulations may be done, but the computer will have to reread the response file each time. It took less than five minutes to read a total of 250 responses to the questionnaire in Figure 1 from cassette files.

How large a questionnaire the program can handle depends on how many questions and answers there are. The longest I've done with my 16K RAM questionnaire had 19 questions and 122 answers. Since the computer holds only a few responses in memory at a time, it can handle almost any number of

responses

The print format is designed for 132 columns (14 inches at 10 CPI, 8½ inches at 16.5 CPI), with 66 lines per page. You may reduce the width to 80 columns by changing the TAB ()'s in lines 1720 and 1750 to 60 and 65, respectively; abbreviating the column headings and/or eliminating one of the percentage columns, and changing the appropriate tabs set by variable Y.

Array DIMensions are set as follows:

N(X) = number of answers per question; X equals number of questions

Q\$(X) = questions; X = number of questions

A\$(X) = answers; X = total number of answers in questionnaire + 3

R\$(X) = responses; X = integer of 190/(number of questions + 1)

R(X,Y) = tally; X = larger value of number of questions or the largest number of answers to one question + 2; Y = largest number of answers to one question + 2 (the program adds two answers to each question for "skipped" and "blank" answers).

I discovered an interesting bug in TI BASIC. You cannot use a DEFined variable to assign subscripts to data read from files. The logical way to program lines 490 and 500 is:

490 FOR 1=1 TO B STEP 3

500 INPUT #2:A\$(V),A\$(V+1),A\$(V+2)

Defined variable V assigns the correct value, but the strings are all read as null.

The questionnaire can be modified to query customers and employees, to carry out scientific surveys, perform tests, or gather statistics in virtually any setting. It is the perfect vehicle for fast and efficient "mass feedback." And as the number of participants grows, your survey becomes more and more accurate. So the large business, institution, school, or hospital need no longer be synonymous with the impersonal one.

<sup>\*\*\$1.50</sup> for first item and 25° each additional item

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	_		
	ublic Investigator	1140-1150	Store response string to
Explanation of the Program			pending print file
Line Nos.		1160-1190	Check for more forms
100-210	Program header and	1200-1210	Print resonses to file
	initialize.	1220-1280	Set end of file flag; return
220-270	Menu.		to menu
280-730	Set up questionnaire.	1290-2250	Print report
290-430	Enter title, number of	1300-1360	Read questionnaire file, if
	questions, questions,		песеѕѕату
	number of answers,	1370-1390	Read response file
	answers.	1400-1480	Tally response
440-620	Proof/correct entries	1490-1520	Initialize print section
630-730	Store questionnaire to file	1530-1890	Print tabular summary
740-1280	Enter responses		report
740-780	Read questonnaire file if	1900-1960	Print cross-tabulations
1 10 100	necessary	1970-2430	Sub-routines
790-820	Open file to store	2440-2510	Print page headings
770 020	responses	2520-2600	Compute percentages,
830-950	Enter responses and edit		print numbers
960-990	Skip to end of	2610-2670	Read questionnaire file
700 370	questionnaire	2680-2730	Read response file
970	Skip one question	2740-2800	Set $array = 0$
980-990	Convert number to letter	2810-2840	Entry error warning
200 230	and add to string	2850-2870	Open print file
1000-1130		2880	End program

```
BUESTIONNAIRE
REM *
         BY
▓▓▓IREM * DAVIDIML DOUGLAS 体.
MEMBER 99"ER VERSION Z.10.1.
REM 3/16/83
DPTION BASE 1
), R((20, 20)
DEF V=A+J
MINIMICALL, CLEAR
MANUSTIONNAIRE TALLY
```

**INSEN**POR I⊨1 TO G

350	INPUT: "":QB(I)
380	INPUT "ENTER NO. ANSWERS: ":N(
	PRINT "ENTER ANSWERS: "
	FOR Jet TO N(I)
	INPUT AS(V)
	IF LEN (A\$ (V)) K64 THEN 430
	PRINT : "LINE TOD LONG. REENTER
	60TD 390
420	GOTO 390
430	NEXT J
	CALL CLEAR
	PRINT GS (I)
14444	PRINT G\$ (I) FOR J=1 TO N(I)
	PRINT "#": J: A\$ (V)
11144	NEXT 3
	INPUT "1=CHANGE GLESTION, 2=CH
	ANGE ANSWER, 3=CORRECT: ": Z
- 10 mg	IF Z>3 THEN 490
	ION Z GOTIO 580,520,610
	INPUT "CHANGE ANSWER #:": J
	IF J>N(I) THEN 520
	INPLIT "NEW ANSWER: "= A\$ (V)
	IF LEN (AS (V)) < 64 THEN 440
	The Property of the property o
	PRINT : "LINE TOO LONG. REENTER
	60TO 540
	PRINT : "REENTER BUESTION: "
270	INPUT ": D\$.(1)
	GOTO: 448 /
	A=A+N(I)
14 4 10 10 10 10 10 10 10 10 10 10 10 10 10	NEX'T I
Mar Pala Sala Sala Sala Sala Sala Sala Sala	INPUT PENTER FILENAME TO STORE
	DUESTIDNNAIRE: " : Z#
	OPEN #1 = Z\$, INTERNAL, DUTPUT, FIX
	ED 192
	FRINT #1: T\$, G, A FDR: I=1 TD D FRINT #1: D\$(I), N(I) NEXT I
	FOR I=1 TO D '
	PRINT W1: D\$(I), N(I)
	NEXT I
7717107174	END TEL TO A STEP 3
	NEXT I FOR I=1 TO A STEP 3 FRINT #1: A\$(I), A\$(I+1), A\$(I+2) NEXT I
i i i i i i i i i i i i i i i i i i i	
	CALDISE #1
	Castinued on p. 90

August 1983

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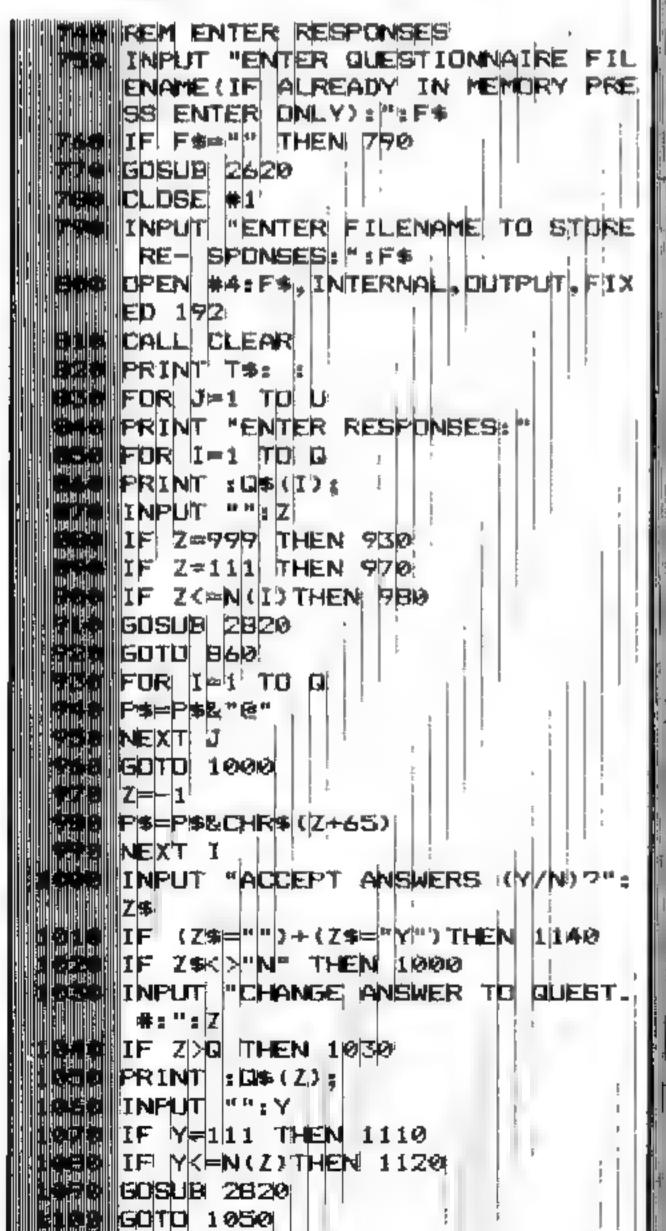
### P.O. BOX 51178, PALO ALTO, CALIFORNIA 94303

FOR I=1 TO C

### Investigator . . . from p. 89

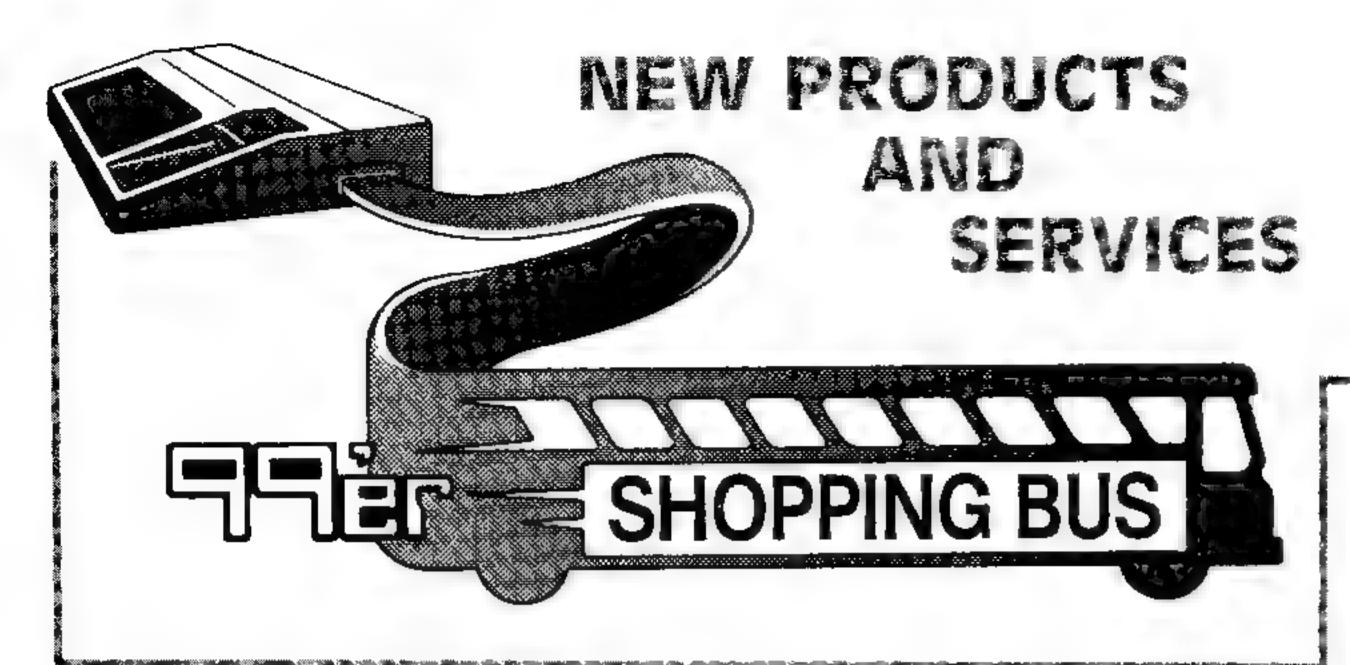
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1120	P\$=SEG\$ (P\$, 1, Z-1)&CHR\$ (Y+65)&S
in property.	ED\$ (F\$, Z+1, Q)
11.30	GDTD 1000
1140	PRINT #4:F5,
1156	P\$=""
1160	INPUT "MORE QUESTIONNAIRES: (Y
	/N)?": Z\$
1170	IF Z'="N" THEN 1230
1188	IF. (Z\$<>"")*(Z\$<>"Y")THEN; (1160)
119世	NEXT 3
1200	PRINT #4: ""
	EDID 639
1220	J⊫ø
1236	IF J=U THEN 1220
1344	FOR JEJH1 TO U
1250	PRINT #4: "9",
1260	NEXT J
1270	CLOSE #4
1260	60TU 210
1279	REM PRINT REPORT
	INPUT "ENTER QUESTIONNAIRE FIL
4   1	ENAME (IF ALREADY IN MEMORY PRE
	SS ENTER ONLY):":F\$
1310	IF F4="" THEN 1370
	GUSUB 2620
	FOR I=1 TO A STEP 3
	INPUT #1:A\$(I),A\$(I+1),A\$(I+2)
التناقع الأوار الألالا	NEXT I
	CLOSE #1
	INPUT "ENTER FILENAME OF RESPO
	NSES: ":F*
	OPEN #2:F*, INTERNAL, INPUT ,FIX
	ED .192
	GOSUB 2690
	FOR J=1 TO U
	IF R\$(J)="9" THEN 1480
	FOR I=1 TO Q
	X=ASC (SE64 (R4 (J), 1, 1))-63
M	R(I,X)=R(I,X)+1
والمساوي المناسب والتناقل	NEXT I
	NEXT J.
	60T0 1370
	CLOSE #2
	GOSUB 2860
Total	

		TOTAL TOTAL
	1546	IF L+N(I)+6K65 THEN 1570
		60SUB 2450
		60SUB 2480
	1200	
Y	E WEED ER	FOR JES TO N(1)+2
٠,		
	Navi de	S=S+R((I,J)
	1500	NEXT: J
9		T=S+R(1,2)
347		
		PRINT #71 : 0 (1) 1 : TAB (70); "EL
- 1		ANK"
		FOR JEO TO N(I)
1		IF J=0 THEN 1660
i	1656	PRINT #7: TAB (75-LEN (AB (V))); AB
		(VD s
į		
.		Z=R(I, J+2)
	1670	Y=84
		GDSUP 2560
	1670	X=T
	1700	Y=101
L		GDSUE 2540
Œ		IF J=0 THEN 1760
	1736	X=5 :
4		Y=124
		6DSUB: 2540
		PRINT #7 '
oll		
		NEXT 3
i		PRINT #7:   TAB(60); "TOTAL RESP
i		DNSEB";
n		N-Od
O		Y=84
		Z=T
X	1810	60SUB 2560
		PRINT #7: : TAB (57); "TOTAL EXCL
	Hill Harri	BLANKS";
- 1		609UB 2569 !
	1954	PRINT #7:
	1860	L=L+N(1)+B
		A=A+N(1)
- 1	1986	NEXT I
	1 200	CLOSE #7
, [		GOSUB 2750
1		INFUT "CROSS-TAB 2 DUESTIONS (
'		Y/ND?": Z\$
		IF Z&="N", THEN 210
, ;		
		IF Z#<>"Y" THEN 1910
		Companyed on = 03



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99'er Shopping Bus Attn: New Products Editor 1500 Valley River Dr., Suite 250 Eugene, OR 97401

### **ALPHACOM SLASHES PRICES**

Alphacom has reduced the price of the Alphacom 42- its 40 column thermal printer with graphics capabilities- from \$179.95 to a suggested retail price of \$119.95, a decrease of \$60.00

Alphacom has also introduced for September shipment a new 80-column printer with graphics capabilities, the Alphacom 81. It carries a suggested retail price of \$169.95. Like the Alphacom 42, the Alphacom 81 features upper and lower case letters, a wrap-around facility (for text longer than 80 columns), and an ability to recognize standard ASCII control or "action" codes for changing the printing modes. Codes include carriage return, line and multi-line feed, right justification, form feed, and graphics control.

For further information contact the Consumer Sales Department, Alphacom, Inc., 2323 South Bascom Avenue, Campbell, CA 95008 (408) 559-8000



### CP/M PROCESSOR

A new CP M processor from Morning Star Software will open up many CP M-based applications possibilities for TI 99/4A users. The CP M processor contains a 5 MHz 8085 CPU and works with the 99 4A 16-bit TI 9900 CPU. No alterations are needed the CP M processor stips into the expansion box. The processor comes with 64K RAM built-in, plus an 8K operating system. For more information contact Morning Star Software. 4325 109th. Avenue, Beaverton, OR 97005, (503) 646-4695 or 1-800 824 2412.

### X-BASIC BOOSTER

Computertronics has announced the realease of a series of new programs for the 99.4A. A program called E.Z-DO XBASE will be the flagship offering.

This program a lows for the easy use of Extended BASIC for graphics displays, animations, slow paced games and other programs. E Z DO XBASE uses 26 statements and 10 commands that are easy to understand. A statement is entered with an autonumbering feature, then all data is screen promptled with no required punctuation syntax. The data is then stored in a compiled listing to stretch the user memory. The program boasts prudent use

### CARRYING CASE FOR THE TI-99/4A

H'S Enterprises has designed a hard carrying case for the TI-99 4A that fits easily under an airline seat, yet carries everything most users need when away from home or office. The only items not accommodated are the CRT monitor and memory expansion accessories

Space utilization is optimal in both the upper and lower compartments of the case, yet all equipment is well-cushioned and readily available. The lower compartment stores the console, speech synthesizer and A-C adapter. The upper case nicely handles a TV modulator, two joysticks, either 14 Command Cartridges/cassette tapes, or a cassette recorder and 7 Command Cartridges/cassette tapes. Cables and books are not forgotten



either—they fit nicely in the custom well beneath the console

The price, \$59.95, includes shipping and handling charges inside the continenta U.S. (Add \$10.00 for foreign shipping and handling.) For more information contact H.S. Enterprises, P.O. Box 128. Suffern, New York 10901, (914) 368-1374.

### SCOTT, FORESMAN RELEASES PROBE

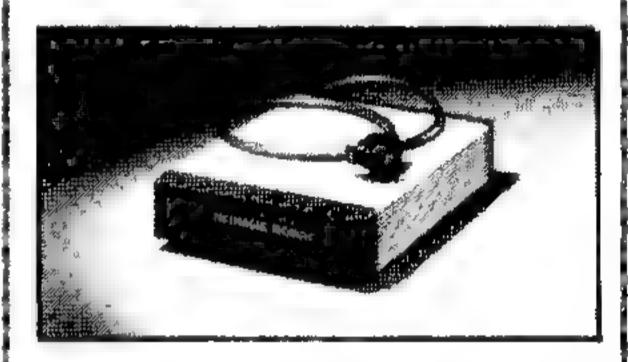
Scott, Foresman and Company, has announced a new PROBE series of educational programs in BASIC. Each PROBE package contains a student workbook, instructor's edition, diskettes, wall charts, and screen grids. The PROBE series for the TI-99-4A will include packages for Primary. Intermediate, and Junior High levels of study. They will cover a wide range of topics in reading and mathematics and will use tutorial, gaming, drill, and practice and simulation modes of computerassisted instruction. These programs will use the computer fully-incorporating color, graphics, music, sound, and animation. For those who prefer à complete game format, the Scott, Foresman Mathematics Action Game Series is available. For further information contact Scott, Foresman and Company, 1900 East Lake Avenue, Glenview, IL 60025, (312) 729-3000.

### **FOLLK OFFERS SERVICES**

FOLLK (Friends of LISP LOGO & Kids) a nonprofit membership organization promoting the use of microcomputers as independent educational alternatives, is dedicated to bringing "languages for learning" such as LOGO and LISP (and other powerful ideas developed in the Artificial Intelligence field) to people of all ages, interests, and levels of computer expertise. Their projects and services include the FOLLK-Lore newsletter monthly FOLLK-Meets, curriculum advising for educators, the FOLLK-Net Bulletin Board system. group and individual workshops in LISP and LOGO, and the FOLLK-Flash Hotline Service. For more information, contact FOLLK at 254 Laguna Honda Boulevard, San Francisco CA 94116, (415) 753 6555

of defined variables, 8 defined shape designs (3 can be redefined by user), 8 user designed sprites, and full use of color. Three Demo programs accompany the package

Users need only the TI-99-4A console, Extended BASIC Cartridge, cassette recorder and joysticks. The program is available on cassette for \$19-95 from Computertronics, P.O. Box 15823, Plantation, FL 33318

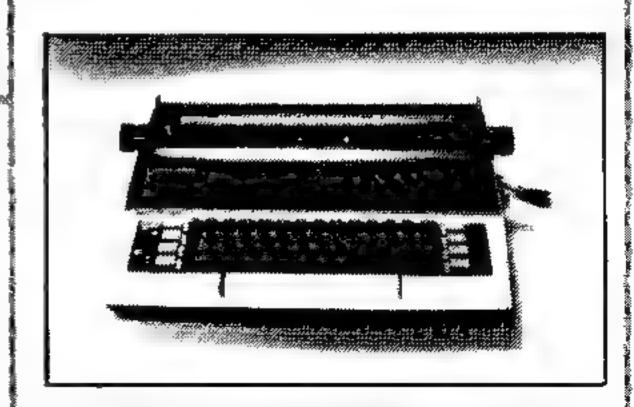


### TYPEWRITER-PRINTERS

The Smith-Corona Group of SCM Corporation has introduced electronic portable typewriters that can double as computer printers with the simple plug-in addition of their optional Messenger Module, or which can be mechanically adapted by authorized Smith-Corona dealers (Memory Correct III). The Memory Correct III Messenger retails for \$599; the Citation III Messenger's suggested retail price is \$575. The suggested retail cost for the optional Messenger Module (to be available this fall) is \$170. The Memory Correct III bears a suggested retail price of \$499.

Additionally, Smith-Corona has introduced a printer compatible with most home and small business computers. The TP-II features R\$232 Serial and Centronics Parallel interface ports and can print out computer program I stings with an ASCII 10:12 pitch printwheel. The suggested retail price for the TP-II is \$895.

For more information contact 5mith Corona, 65 Locust Avenue, New Canaan, CT 06840, (203) 972 1471



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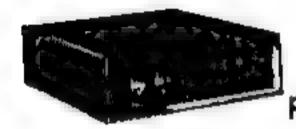
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### Investigator . . . from p. 90

```
INPUT "WHICH QUESTIONS (E.S. 5
5 ( P): ":C,B
1 1940 IF (C>D)+(B>D)+(C>=B) THEN 1940
TIPEN #2: F*, INTERNAL, INPUT , FIX
    ED 192
1970 GDBUB 2690
LACO FOR JE! TO U
1444 IIF R$ (J) ="9" THEN 2050
は他の Y⊨ASC(5E5$(R$(J),C,1))-63
2020 R(X,Y) =R(X,Y)+1
2630 NEXT J
2040 GOTO 1970
2000 CLDSE #2
2040 GDSUB 2840
2070 GDSUB 2450
PRINT #7: "CRD55-TABLLATION FOR
     : ": TAB:(5); @#-(C): TAB(5); [[#-(8):
INTO NICE)+1
PRINT #7: TAB (6#1); CHR# (6#HI);
 LID NEXT I
 PRINT MY
    FDR I=2 TD N(B)+2
   6 505UB 2560
    FUR J=2 TO N(C)+2
21日の Y=6*(J-1)+2
 190 ZER(I,J)
   605UB 2560
STILL NEXT J
PRINT #7
MEXT I
2214 GDSUB 2750
2264 FOR I=1 TO C-1
2274 A=A+N(I)
22B# NEXT I
#2744 PRINT #7: 2"KEYs": 2 D# (C) 2"
      A | BLANK!"
2360 FOR JE1 TO N(C)
25 PRINT #7: TAB (5) ; CHR# (65+J);" =
      ":A珠(V)
ZBY NEXT J
 FOR THE TO B-1
   A=A+N(I)
    NEXT I
PRINT #7: :G*(B):"
     FOR J≔1 TO N(B)
    Z≔J+1
```

ı		60110: 1890:
		REM FAGE HEAD ;
H		PEPHI ( !
Ą		PRINT #7; CHR  (12): TAB  (132  LEN (15)) / (2); [15; TAB (125); ["PASE"; P:
1		2
į	2478	RETURN
i	11 11 11 11 11 11 11 11 11	FRINT #7: TAB (75); "NO. RESPONSE
ı		S"; TAB(95); "% OF TOTAL"; TAB(11
		5); "% EXCLUD. BLANKS"
		PRINT #7: TAB (75); "
1		-"; TAB (95); "; TAB (11
	2500	
ı		RETURN
		REM COMPUTE 1%
	2539	X=1
1	2011	IF X=0 THEN 2530
		Z=INT(R(I,JH2) *1000/XH.5)/10
Н	7565	IF POS(STR#(Z),",",1)THEN 2590
		PRINT #7: TAB (Y-LEN (STR* (Z))); S
Н		RETURN
	2500	FRINT #7: TAB (Y+1-POS (STR#(Z),"
		.",1));STR#(Z); RETURN
į	2589	RETURN
		REM READ G FILE
		OPEN #1:F\$, INTERNAL, INFUT, FIX
		ED 192
H		INPUT #1: T\$, Q, A
Ш		INPUT #1:CF(I),N(I)
Ш	2466	NEXT I
	2476	RETURN
H		REM READ RESPONSE FILE
ı		FOR J=1 TO U
		INPUT #2:R*(J),
1		INPUT #2:Z*
Ш		RETURN
Ш	2744	REM PREATER
		FOR I=1 TO 20
	2740	FOR J=1 TO 20
ı		R(I,J)=0
ı		NEXT J
ı	MALL TO THE TAXABLE PARTY OF TAXABLE PA	RETILIRAN
		REM ERROR
		CALL SOUND (200, 110,0)
	2230	PRINT : "INVALID ENTRY. REENTER
		- ''' 3 3 ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
		RETURN REM OPEN PRINTER
1		OPEN #7: "R5232.BA=1200", VARIAB
`		LE 132
	SH3#	RETURN
	2800	END

60TO: 1896

### Purl Two . . . from p. 11

2510 FRINT #7:" = ":A\$(V)

COSUB 2560

DAZM NEXT J

strongly as the program sales. Keil is currently planning a line of children's patterns to be on the market by this summer. Her only problem, she says, is finding more hours in the day to adapt her present programs to all home computers so that she can be free to produce new patterns.

The women agree that the meeting of their respective businesses has been an inspiring and creative experience for them. They look forward to continued success in the knitting pattern market, for they both agree that their only limit is the time that it takes to produce each inventive computer knitting program.

Continued on p. 94

1919 er

	Skirt Pattern A-Line ation of the Program	1940-2180	Routine to initialize variables.
Line Nos. 100-190 200-300	Rems. Title screen.	2190-2230 2240-2280	Variables for drape. Variables for hem to hip decreases.
310-420	Print special information.	2290-2330	Variables for hip to waist
430-440	Input measurements and initialize variables.	2340-2400	Special note for no
450-570 580-690	Stitch summary. Row summary.	2410-2560	decreases.  Parallelogram shape.
700-960 970-1110	Skirt shaping. Finishing.	2570-2770	Routine for part row knitting.
1120-1270	Waist band.	2780-3030 3040-3360	Fashion drape for back.
1280-1400 1410-1550	Option to run again. Error message.	3370-3420	Clear screen and print header.
1560 1570-1600 1610-1820 1830-1930	End. Spacing lines Finishing. Hem.	3430-3450 3460-3500	End the screen.  Pause and wait for key to be pressed.

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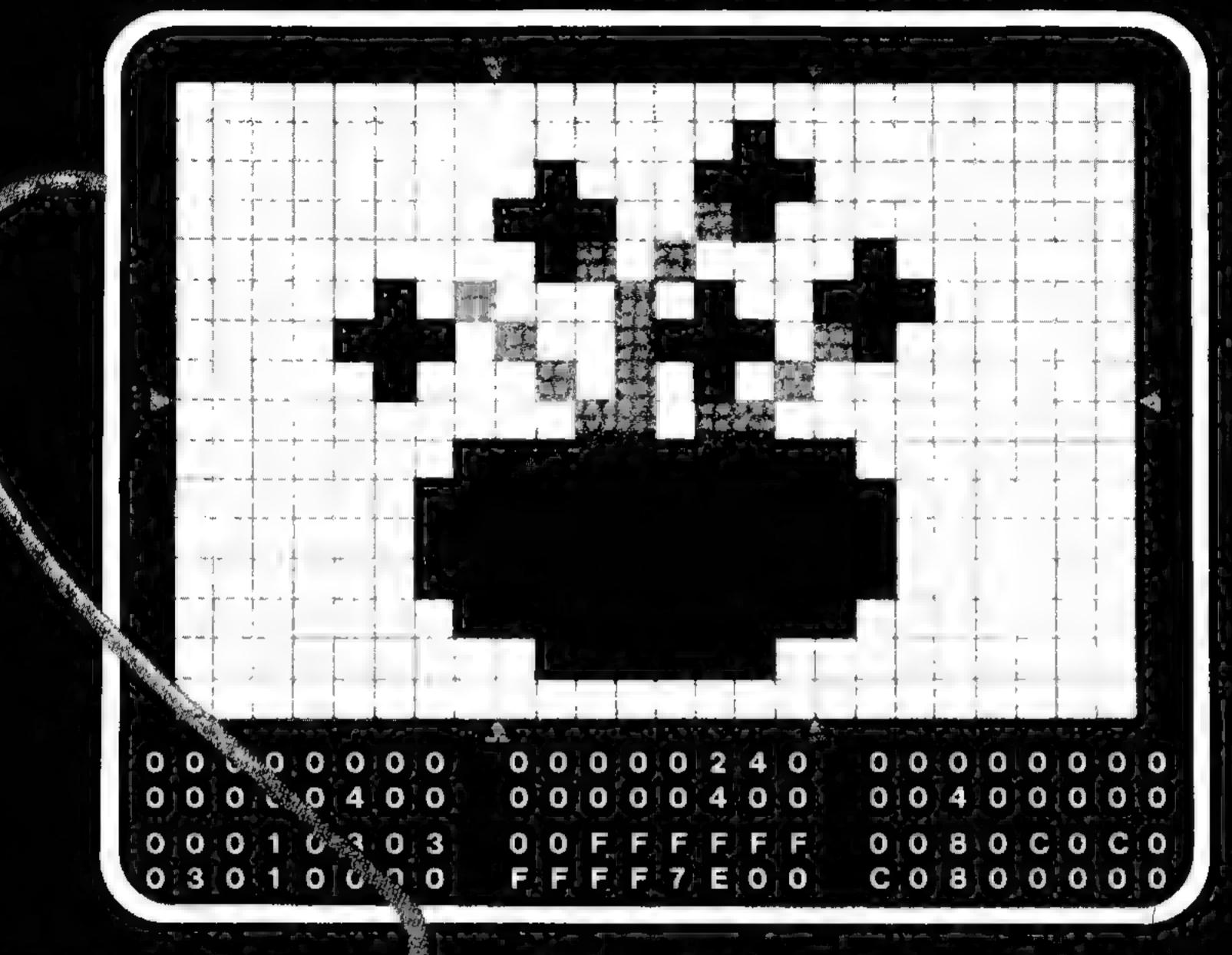


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PRINT "TOTAL ROWS TO KNIT:"; LN 155 PRINT "MARKING FIRST ROW."  LUC PRINT : :  PRINT "ND ROWS BOTTOM TO HIP:"  PRINT "KNIT ONE ROW LOOSE TENS  PRINT "KNIT ONE ROW LOOSE TENS	187 160 SUB 3460	
PRINT "TOTAL ROWS TO KNIT:		PRINT "KNIT"; BA1; "ROWS OF BAND
PRINT "MARKING FIRST ROW."  LINE PRINT "MARKING FIRST ROW."		
PRINT : :  BEN PRINT "ND ROWS BOTTOM TO MIP: " FRINT "KNIT ONE ROW LOOSE TENS BH1 FRINT "ND ROWS BOTTOM TO MIP: " FRINT "KNIT ONE ROW LOOSE TENS	TATION TO THE RUMB TO RELEASE	
PRINT "ND ROWS BUTTOM TO HIP:" PRINT "KNIT ONE ROW LOOSE TENS	PRINT :	
PRINT : : : : : : : : : : : : : : : : : : :	1.5361111111	
	PRINT : : :	

	LICTAL MAD MODES WILL IN MATOLE 3
	-41
	PRINT:
	PRINT "NO ROWS IN WAIST BAND:"
	; BA1
670	GOSUB 3430
684	GOSUB 1570
696	GOSUB 3460.
7.44	SAM SHAPING HEM"
	GOSUB 3370
1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 .	GOSUB 1830
	G0SUB 2190
	GDSUB 2780
	PRINT
740	60SUB 3430
770	GOSUB 1570
760	609UB 3460
790	GOSUB 2240
	S#=" SHAPING HEM TO HIPLINE"
	GOSUB 3370
	G05UB 2410
	GIOSIUB 3/4/30
Helli III III Sacra Committee (Committee Committee Commi	
	GOSUB 1570
	605UB 3460
	SS-" SHAPING HIP TO WAIST"
	GOSUB 3370
	609UB 2290
4970	IF DE2=0 THEN 900 ELSE 920
700	GOSUB 2340
	GOTO 930
FILE 11 11 11 11 11 11 11 11 11 11 11 11 11	GDSUB 2410
	60SUB 3430
	GOSUB 1570
	PRINT
Attention of the second	609UB 3460
	609UB 1700
	S*=" FINISHING!"
	60SUB 3370
11111711.35	PRINT
	PRINT "SEAM TO FURM A FRONT AN
111.111.	D"
	PRINT
1030	PRINT "BACK SECTION OF SKIRT."
1940	PRINT
	PRINT "HANG WAIST OF SKIRT FROM
	NT"
	PRINT
HIMITINE	PRINT "TO"; WAZ: "STS."
	PRINT
- III B   11 K   11 H   12	6DSUB 3430
	60SUB 1570
	GOSUB 3460
	GOSUB 3370
	PRINT
Tankillan and the	PRINT "KNIT"; BA1; "RDWS OF BAND
	PRINT
	PRINT "MARKING FIRST ROW."
J 1.78	FRINT
1100	PRINT "KNIT ONE ROW LOOSE TENS
	TON- "

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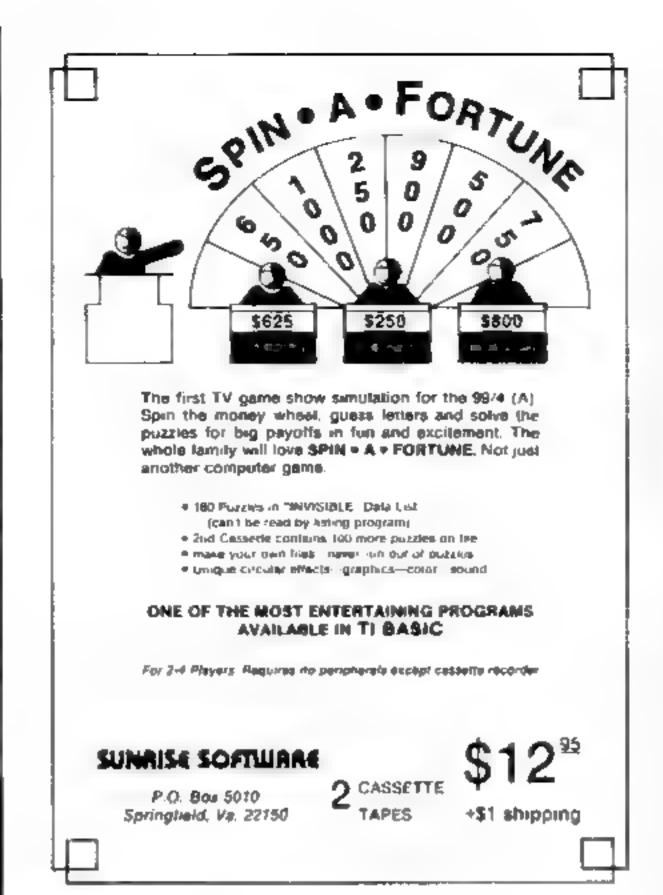
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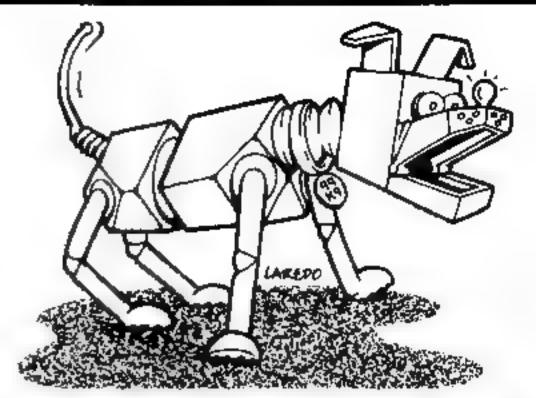
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```
型型的物 RETURN
型型學》 BR=INT(BH1+1)
型ぎ身を IISW=INT(DE2/2)
经惠注数 KW1≕HL1
23200 RW=HL1--1
登場選集 RETURN
                  PLEASE NOTE!"
2544 PRINT "
2350 PRINT
PRINT "THERE WILL BE NO DECREA
    SE.9"
DESTRIPE TO THE WAI
登場開像 PRINT : :
PRINT "KNIT EVEN TO ROW"; LN1
2400 RETURN
整件连续 ST1=INT(RW/SW)
2424 RE=INT(RW-(ST1#SW))
PART IF RE-0 THEN 2440 ELSE 2460
2444 RE1=5W
2450 GOTO 2480
選挙系数 RE1=SW-RE
Z470 PRINT
PRINT "STS TO DEC EACH SIDE"; S
2490 PRINT : I
250 M PRINT "DEC 1 ST/"; ST1; "RS/"; RE
    1; "TIMES"
2534 IF RE< >0 THEN 2520 ELSE 2540
25登 PRINT : i
2536 PRINT "DEC 1 ST/"; ST1+1; "RS/";
     RE; "TIMES"
図書書物 PRINT : 8'
PRINT "BEGIN DEG ROW" : BR+971
RETURN
空間を RM=INT (RW/2)
ST1=INT(SW/RW)
型型を使用にコエNT(ISN-- (IST1 村RW))
THEN 2410 ELSE 2430
Main RE1=RW
2425 GOTO 2640
ZATA REINERWHRE
PRINT BEGIN SHORT ROW ON ROW"
PRINT "FOR "; ES; " SR ARE NOT"
PRINT "COUNTED IN TOTAL ROWS."
2676 IF ST1<=0 THEN 2680 ELSE, 2700
2680 RE=RE1+RE
2690 GOTO 2740
PRINT
PRINT "PLACE"; ST1; "STS INTO HV
    P"; RE1
PRINT "TIMES"
THEN 2750 ELSE 2770
PRINT
PRINT "PLACE"; ST1+1; "STS INTO
    H/PP ; RE
```

Continued on p. 98

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Persuasion . . . from p. 63
    RESTORE
     FOR BAR=1 TO 4
    温温は CL MN=ア*PAR
    KEAD VOTE, PERCENT
      REMIRESERVED TO READ FILES!
     MANIFULATE DAT
     BARHETIGHT=VOITE/SCALE
     TOPPATTERN=1+INT ((REMAINDER*8)
     IN THEN 1660
     MANAMITE YY) 19 THEN 1430 ELSE 1550
     1444 YY⊨21
     GUSUB 2520
      THE STATE OF THE PARTY OF THE P
       LABELS="SCALE"
      MANA LABELS OFF
     RDW=1
     CLMN=CLMN+1
     605UB 2480
     | IF | Z > 1 THEN | 1550 ELSE | 1560
     60SUB 2520
     POSITIONE2*TOPPATTERN+19
     BARHEADS = 5EG$ (MASTER1$, PDSITIO
                  N, 16)
     CALL CHAR (107+BARFE, BARHEADE)
     PARHEADS - SEGS (MASTER 25, POSITIO
                  N. 16)
      CALL CHAR (108+BAR*8, BARHEAD®)
      BARHEAD#=BEG# (MASTER3#, PDSITID
                   N. 16)
     CALL CHAR (105+BARKB, BARHEADA)
      MADE CALL HCHAR (21-YY, CLMN-1, 107+BA
      MANAGE CALL HICHAR (IZITEYY, CLMN, 108+BARK
      MANAMICALL HCHAR (21-YY, CLMN+1, 109+BA)
                  代本日)
        POSITION-24TOPPATTERN-1
       CALL CHAR (107+BAR, BARCAPS)
      CALL HEHAR (20-YY, ELMN-1, 107+8A)
       TOPPATTERN< >B THEN 1750
     MINIMUCALL CHAR (107+BARKB, FFFFFFFFFFFF
```

```
1720 CALL CHAR (108+BAR*B, "FFFFFFFFFF
    FFFFFØØ")
1730 CALL CHAR (109+BAR*8, "FFFFFFFFFF.
     FFFFF03")
1748 GOTO 1810
1750 IF TOPPATTERNK >9 THEN 1870
THEN 1870
PROBLEMENT (19-YY, CLMN-1, 107, 3)
1780 CALL CHAR (107+BAR*8, "FFFFFFFFFFF
    FFFC0C0")
1796 CALL CHAR (108+BAR#B, "FFFFFFFFFF
     FFF0000")
1800 CALL CHAR (109+BAR*B, "FFFFFFFFFF
     FFF0303")
1818 CALL HOHAR (20-YY, CLMN-1, 107+BA
     R#8)
1828 CALL HCHAR (20-YY, CLMN, 198+BAR)
LETE CALL HCHAR (20-YY, CLMN+1, 109+BA
BAR CALL HCHAR (21-YY, CLMN-1, 104+BA
     R#8)
1034 CALL HICHAR (21-YY, CLMN, 105+BAR*
 CALL HCHAR (21-YY, CLMN+1, 186+BA
     (B#3)
1870 CALL HCHAR (21, CLMN-1, 97)
1000 CALL HOHAR (21, CLMN, 98)
1674 | CALL HOHAR (21, CLMN+1, 99)
LABELS=STR4 (PERCENT) &"%"
1910 IF YYKS THEN 1920 ELSE 1940
1時26 ROW=17-YY
1930 GOTO 1950
1944 RUW=19-YY/2
1969 GOSUB 2428
1980 LABELS-STR* (VOTE)
1974 RDW=24
CLMN=CLMN-2
199# GDSUB 2470
ZOOD NEXT BAR
2010 LABEL #=VERTICAL1#
200-3
MACHINE CLMN=3
2015UB 2470
 記事時間 LABEL #=VERT.ICAL 2 #
2040 ROW-ROW+1
2070 CLMN=CLMN-1
2000 GOSUB 2479
 MARIN REM 4---- TITLE BOX
型1個個 L1=LEN(TITLELINE1年) !
2110 L2=LEN(TITLELINE2$)
2120 IF LIKEZ THEN 2130 ELSE 2140
```

21.40 CALL WCHAR (RO., CL.+L1, 150, 2) 21.50 CALL HCHAR (RO1, CL.+L1, 151) 21.60 CALL HCHAR (RO1, CL1, 144, L1) 21.70 CALL HCHAR (RO1, CL1, 146, 2) 21.70 CALL HCHAR (RO., CL1, 146, 2) 21.70 CALL HCHAR (RO., CL., 32, L1) 22.70 CALL HCHAR (RO., CL., 32, L1) 22.71 CALL HCHAR (RO., CL., 32, L1) 22.72 CLMN-CL 22.73 GOSUB 24.70 22.74 REM *- IS THERE A 2ND LINE? -* 22.75 GOSUB 24.70 22.76 CALL HCHAR (RO.+1, CL1, 147) 22.76 CALL HCHAR (RO.+1, CL1, 148, L1) 22.76 CALL HCHAR (RO.+1, CL., 148, L1) 23.70 CALL HCHAR (RO.+1, CL., 32, L1) 23.70 CALL HCHAR (RO.+2, CL1, 147) 23.70 CALL HCHAR (RO.+2, CL1, 148, L1) 23.70 CALL HCHAR (RO.+2, CL1, 147) 23.70 CALL HCHAR (RO.+2, CL1, 148, L1) 23.70 CALL HCHAR (RO.+2, CL1, 149) 23.70 CALL HCHAR (RO.+2, C
2154 CALL HCHAR (RO-1, CL-+L1, 151) 2160 CALL HCHAR (RO-1, CL-1, 144, L1) 2170 CALL HCHAR (RO, CL-1, 144, L1) 2180 CALL HCHAR (RO, CL-1, 146, 2) 2190 CALL HCHAR (RO, CL, 32, L1) 2200 LABELS TITLELINE  2210 ROWERD 2220 CLMNECL 2230 GOSUB 2470 2240 REM *- IS THERE A 2ND LINE? -* 2250 IF TITLELINE 25 = " THEN 2260 EL SE 2300 2260 CALL HCHAR (RO+1, CL-1, 147) 2271 CALL HCHAR (RO+1, CL-1, 147) 2272 CALL HCHAR (RO+1, CL-1, 147) 2390 CALL HCHAR (RO+1, CL, 32, L1) 2390 CALL HCHAR (RO+1, CL, 32, L1) 2391 CALL HCHAR (RO+2, CL-1, 147) 2392 CALL HCHAR (RO+2, CL-1, 147) 2393 CALL HCHAR (RO+2, CL-1, 147) 2394 CALL HCHAR (RO+2, CL-1, 147) 2395 CALL HCHAR (RO+2, CL-1, 147) 2396 CALL HCHAR (RO+2, CL-1, 147) 2397 CALL HCHAR (RO+2, CL-1, 147) 2398 CALL HCHAR (RO+2, CL-1, 147) 2399 CALL HCHAR (RO+2, CL-1, 147) 2390 CALL HCHAR (ROH2, CL-1, 147) 2490 CALL HCHAR (ROH2, CL-1, 147)
217. CALL HCHAR (RO-1, CL-1, 145) 218. CALL WCHAR (RO, CL-1, 146, 2) 219. CALL HCHAR (RO, CL, 32, L1) 220. LABELS TITLE LINE   \$ 221. ROWERD 222. CLMMECL 223. GOSUB 2470 224. REM *- IS THERE A 2ND LINE? -* 225. IF TITLE LINE   \$ 226. CALL HCHAR (RO+1, CL-1, 147) 226. CALL HCHAR (RO+1, CL-1, 147) 227. CALL HCHAR (RO+1, CL-1, 147) 227. CALL HCHAR (RO+1, CL, 32, L1) 231. LABELS = TITLE LINE   \$ 233. CALL HCHAR (RO+1, CL, 32, L1) 231. CALL HCHAR (RO+2, CL-1, 147) 231. CALL HCHAR (ROH+2, CL-1, 147) 231. CALL HCHAR (ROH-1, CL
2:30 CALL VCHAR (RO, CL1, 146, 2) 2:10 CALL HCHAR (RO, CL., 32, L1) 2:20 CALL HCHAR (RO, CL., 32, L1) 2:21 ROW=RO 2:22 CAMN=CL 2:39 GOSUB 2470 2:24 REM * IS THERE A 2ND LINE? -* 2:25 IF TITLE INE2*="" THEN 2:260 EL SE 2:300 2:26 CALL HCHAR (RO+1, CL1, 147) 2:27 CALL HCHAR (RO+1, CL1, 148, L1) 2:27 CALL HCHAR (RO+1, CL., 148, L1) 2:30 CALL HCHAR (RO+1, CL., 32, L1) 2:31 ROW=RO+1 2:32 ROW=RO+1 2:33 GOSUB 2470 2:34 CALL HCHAR (RO+2, CL1, 147) 2:35 CALL HCHAR (RO+2, CL1, 147) 2:36 CALL HCHAR (RO+2, CL1, 147) 2:37 CALL HCHAR (RO+2, CL1, 147) 2:38 CALL HCHAR (RO+2, CL1, 147) 2:39 CALL HCHAR (RO+2, CL1, 147) 2:30 CALL HCHAR (RO+2, CL1, 148) 2:30 CALL HCHAR (RO+2, CL1, 149) 2:30 REM ** SUBROUTINE FOR FOR P=1 TO LEN (LABEL*) 2:30 FOR P=1 TO LEN (LABEL*) 2:30 CALL HCHAR (ROM, CLMN-1+P, ASC (SE G* (LABEL*, P, 1))) 2:30 CALL HCHAR (ROM, CLMN-1+P, ASC (SE G* (LABEL*, P, 1))) 2:30 CALL HCHAR (ROM, CLMN-1+P, ASC (SE G* (LABEL*, P, 1))) 2:30 CALL HCHAR (ROM, CLMN-1+P, ASC (SE G* (LABEL*, P, 1))) 2:30 CALL HCHAR (ROM, CLMN-1+P, ASC (SE G* (LABEL*, P, 1))) 2:30 CALL HCHAR (ROM, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))
2100 LABELS TITLELINE 1
2216 ROW=RO 2226 CLMN=CL 2236 GOSUB 2470 2246 REM *- IS THERE A 2ND LINE? -* 2250 IF TITLELINE2*="" THEN 2260 EL SE 2300 2266 CALL HCHAR (RO+1, CL-1, 147) 2278 CALL HCHAR (RO+1, CL-1, 148, L1) 2280 CALL HCHAR (RO+1, CL-1, 149) 2390 CALL HCHAR (RO+1, CL-1, 149) 2390 CALL HCHAR (RO+1, CL-1, 147) 2310 ROW=RO+1 2330 GOSUB 2470 2330 CALL HCHAR (RO+2, CL-1, 147) 2330 CALL HCHAR (RO+2, CL-1, 147) 2330 CALL HCHAR (RO+2, CL-1, 148, L1) 2330 CALL HCHAR (RO+2, CL-1, 149) 2330 CALL HCHAR (ROH+P-1, CLMN, ASC (SE GE (LABEL*, P, 1))) 2330 CALL HCHAR (ROM+P-1, CLMN, ASC (SE GE (LABEL*, P, 1))) 2330 CALL HCHAR (ROM+P-1, CLMN, ASC (SE GE (LABEL*, P, 1))) 2330 CALL HCHAR (ROM+P-1, CLMN, ASC (SE GE (LABEL*, P, 1))) 2331 ROM *- SUBROUTINE FOR EAR 2439 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GE (LABEL*, P, 1))) 2430 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GE (LABEL*, P, 1))) 2431 ROM *- SUBROUTINE FOR EAR 2431 CALL HCHAR (ROM+P-1, CLMN-1+P, ASC (SE GE (LABEL*, P, 1))) 2431 ROM *- SUBROUTINE FOR EAR 2432 CALL HCHAR (ROM+P-1, CLMN-1+P, ASC (SE GE (LABEL*, P, 1))) 2432 CALL HCHAR (ROM+P-1, CLMN-1+P, ASC (SE GE (LABEL*, P, 1))) 2433 CALL HCHAR (ROM+P-1, CLMN-1+P, ASC (SE GE (LABEL*, P, 1)))
2210 ROW=RO 2220 CLMN=CL 2230 GOSUB 2470 2240 REM *- IS THERE A 2ND LINE? -* 2250 IF TITLELINE2*="" THEN 2250 EL SE 2300 2260 CALL HCHAR(RO+1, CL-1, 147) 2271 CALL HCHAR(RO+1, CL-1, 148, L1) 2290 CALL HCHAR(RO+1, CL-1, 148, L1) 2300 CALL HCHAR(RO+1, CL-, 32, L1) LABEL*=TITLELINE2* 2330 CALL HCHAR(RO+2, CL-1, 147) 2330 CALL HCHAR(RO+1, CL-1, 147) 2330 CALL HCHAR
2236 CLMN=CL 2238 GDSUB 2470 2248 REM *- IS THERE A 2ND LINE? -* 2256 IF TITLELINE2*="" THEN 2260 EL SE 2300 2266 CALL HCHAR (RO+1, CL-1, 147) 2271 CALL HCHAR (RO+1, CL-1, 148, L1) 2290 CALL HCHAR (RO+1, CL-1, 149) 2390 CALL HCHAR (RO+1, CL-, 32, L1) 2390 CALL HCHAR (RO+2, CL-1, 147) 2318 ROW=RO+1 GDSUB 2470 2318 ROW=RO+1 GDSUB 2470 2318 ROW=RO+1 2330 CALL HCHAR (RO+2, CL-1, 147) 2318 CALL HCHAR (RO+2, CL-1, 148, L1) 2319 CALL HCHAR (RO+2, CL-1, 149) 2310 REM RESERVED TO CLOSE FILES END 2310 REM *- SUBROUTINE FOR VERTICAL LABELS -* FOR P=1 TO LEN (LABELS) 2310 REM *- SUBROUTINE FOR VERTICAL LABELS -* FOR P=1 TO LEN (LABELS) 2310 REM *- SUBROUTINE FOR HORIZONTAL LABELS -* FOR P=1 TO LEN (LABELS) 2310 REM *- SUBROUTINE FOR HORIZONTAL LABELS -* FOR P=1 TO LEN (LABELS) 2310 REM *- SUBROUTINE FOR HORIZONTAL LABELS -* FOR P=1 TO LEN (LABELS) 2311 REM *- SUBROUTINE FOR HORIZONTAL LABELS -* FOR P=1 TO LEN (LABELS) 2311 REM *- SUBROUTINE FOR HORIZONTAL LABELS -* FOR P=1 TO LEN (LABELS) 2312 REM *- SUBROUTINE FOR HORIZONTAL LABELS -* FOR P=1 TO LEN (LABELS) 2313 REM *- SUBROUTINE FOR RETURN
2236 GOSUE 2470  2240 REM *- IS THERE A 2ND LINE? -*  2250 IF TITLE INE2*="" THEN 2260 EL  SE 2300  2250 CALL HCHAR (RO+1, CL-1, 147)  2270 CALL HCHAR (RO+1, CL-1, 148, L1)  2300 CALL HCHAR (RO+1, CL, 32, L1)  2310 CALL HCHAR (RO+1, CL, 32, L1)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (ROH+P-1, CLMN, ASC (SE G* (LABEL*, P, 1)))  2311 REM *- SUBROUTINE FOR HORIZONTAL LABELS *  FOR P=1 TO LEN (LABEL*)  2430 CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  2431 RETURN  REM *- SUBROUTINE FOR BAR STEMS *  501 (LABEL*, P, 1)))  2431 RETURN  REM *- SUBROUTINE FOR BAR STEMS *  502 CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))
250 IF TITLE INE2*="" THEN 2260 EL  SE 2300  2260 CALL HCHAR (RO+1, CL-1, 147)  2271 CALL HCHAR (RO+1, CL, 148, L1)  2380 CALL HCHAR (RO+1, CL, 32, L1)  2310 CALL HCHAR (RO+1, CL, 32, L1)  2310 CALL HCHAR (RO+2, CL-1, 147)  2330 FEND  2330 FEND  2330 FEND  2330 CALL HCHAR (RO+2, CL-1, 147)  2330 CALL HCHAR (ROH-2, CL-1, 147)  2330 CALL HC
SE 2300  2260 CALL HCHAR (RO+1, CL-1, 147)  2271 CALL HCHAR (RO+1, CL, 148, L1)  2290 CALL HCHAR (RO+1, CL, 132, L1)  2310 CALL HCHAR (RO+1, CL, 132, L1)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 147)  2310 CALL HCHAR (RO+2, CL-1, 148, L1)  2310 CALL HCHAR (RO+2, CL+L1, 149)  2310 CALL HCHAR (RO+2, CL+L1, 149)  2310 CALL HCHAR (RO+2, CL+L1, 149)  2310 REM RESERVED TO CLOSE FILES  2310 REM ***END***END***END***END**  2310 REM ***END***END***END**  2310 REM ***END***END***END**  2310 REM ***END***END***END**  2310 REM ***END***END**  2310 REM ***END***END**  2310 REM ***END**
CALL HCHAR (RO+1, CL-1, 147)  ZZ78 CALL HCHAR (RO+1, CL, 148, L1)  ZZ70 CALL HCHAR (RO+1, CL, 149)  ZZ70 CALL HCHAR (RO+1, CL, 32, L1)  ZZ70 CALL HCHAR (RO+1, CL, 32, L1)  ZZ70 CALL HCHAR (RO+2, CL-1, 147)  ZZ70 CALL HCHAR (RO+2, CL-1, 147)  ZZ70 CALL HCHAR (RO+2, CL-1, 147)  ZZ70 CALL HCHAR (RO+2, CL-1, 148, L1)  ZZ70 CALL KEY (0, K, S)  ZZ70 CALL KEY (0, K, S)  ZZ70 CALL KEY (0, K, S)  ZZ70 REM RESERVED TO CLOSE FILES  ZZ70 REM RESERVED TO CLOSE FILES  ZZ70 REM ***END***END***END***END**  ZZ70 FOR P=1 TO LEN (LABEL\$)  ZZ70 CALL HCHAR (ROM+P-1, CLMN, ASC (SE G\$ (LABEL\$, P, 1)))  ZZ70 REM *- SUBROUTINE FOR HORIZONTAL LABELS -*  FOR P=1 TO LEN (LABEL\$)  ZZ70 REM *- SUBROUTINE FOR HORIZONTAL LABELS -*  FOR P=1 TO LEN (LABEL\$)  ZZ70 REM *- SUBROUTINE FOR HORIZONTAL LABELS -*  FOR P=1 TO LEN (LABEL\$)  ZZ70 REM *- SUBROUTINE FOR HORIZONTAL LABELS -*  FOR P=1 TO LEN (LABEL\$)  ZZ70 RETURN  ZZ70 RETURN  ZZ70 RETURN  REM *- SUBROUTINE FOR BAR  STEMS *  SUBROUTINE FOR BAR
CALL HCHAR (RD+1, CL, 148, L1)  2280 CALL HCHAR (RD+1, CL, 149)  2370 CALL HCHAR (RD+1, CL, 32, L1)  2310 CALL HCHAR (RD+1, CL, 32, L1)  2310 CALL HCHAR (RD+2, CL, 147)  2330 CALL HCHAR (RD+2, CL, 148, L1)  2330 CALL HCHAR (RDH+2, CL
2280 CALL HCHAR (RD+1, CL+L1, 149) 2270 GDTD 2370 2300 CALL HCHAR (RD+1, CL, 32, L1) 2310 LABEL*=TITLELINE2* 2330 GDSUB 2470 2330 CALL HCHAR (RD+2, CL-1, 147) 2330 CALL HCHAR (RD+2, CL-1, 147) 2330 CALL HCHAR (RD+2, CL-1, 148, L1) 2330 CALL HCHAR (RD+2, CL-1, 149) 2370 CALL KEY (0, K, S) 2370 CALL KEY (0, K, S) 2370 REM RESERVED TO CLOSE FILES 2370 REM ***END***END***END***END** 2370 REM ***END***END***END***END** 2370 REM ***END***END***END** 2370 REM ***END***END***END*** 2370 REM ***END****END***END*** 2370 REM ***END***END***END*** 2370 REM ***END***END***END*** 2370 REM ***END***END***END*** 2370 REM ***END***END****END*** 2370 REM ***END***END*** 2370 REM ***END***END*** 2370 REM ***END****END*** 2370 REM ***END****END*** 2370 REM ***END****END*** 2370 REM ***END****END****END*** 2370 REM ***END****END****END*** 2370 REM ***END****END****END**** 2370 REM ***END*****END*****END***** 2370 REM ***END*********************************
2370 GOTO 2370 2300 CALL HCHAR (RO+1, CL, 32, L1) 2318 LABELS=TITLELINE25 2330 GOSUB 2470 2330 GOSUB 2470 2330 CALL HCHAR (RO+2, CL-1, 147) 2330 CALL HCHAR (RO+2, CL-1, 148, L1) 2350 CALL HCHAR (RO+2, CL+L1, 149) 2370 CALL KEY (0, K, S) 2370 CALL HCHAR (ROM+P-1, CLMN, ASC (SE GS (LABELS, P, 1))) 2370 CALL HCHAR (ROM+P-1, CLMN, ASC (SE GS (LABELS, P, 1))) 2370 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1))) 2370 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1))) 2370 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1))) 2370 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1))) 2370 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1))) 2370 CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))
ROWERD+1  CALL HCHAR (RD+2, CL-1, 147)  CALL HCHAR (RD+2, CL, 148, L1)  CALL HCHAR (RD+2, CL+1, 147)  CALL HCHAR (RD+2, CL+L1, 147)  CALL KEY (0, K, S)  CALL HCHAR (RD+2, CL+L1, 147)  CALL KEY (0, K, S)  CALL HCHAR (RD+2, CL+L1, 147)  CALL KEY (0, K, S)  CALL HCHAR (RD+2, CL+L1, 147)  CALL KEY (0, K, S)  CALL HCHAR (RD+2, CL+L1, 147)  CALL KEY (0, K, S)  CALL HCHAR (RD+2, CL+L1, 147)  CALL HCHAR (RD+
ROWERD+1  2530 GDSUB 2470  2530 CALL HCHAR (RD+2, CL-1, 147)  2530 CALL HCHAR (RD+2, CL, 148, L1)  2530 CALL HCHAR (RD+2, CL, 148, L1)  2530 CALL HCHAR (RD+2, CL, 148, L1)  2530 CALL KEY (0, K, S)  2530 IF S=0 THEN 2370  2530 REM RESERVED TO CLOSE FILES  2540 END  REM ***END***END***END***END**  2530 FOR P=1 TO LEN (LABELS)  2540 FOR P=1 TO LEN (LABELS)  2540 CALL HCHAR (ROW+P-1, CLMN, ASC (SE G* (LABEL*, P, 1)))  2550 REM *- SUBROUTINE FOR HDRIZONTAL LABELS *  2550 FOR P=1 TO LEN (LABEL*)  2550 FOR P=1 TO LEN (LABEL*)  2550 CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  2550 RETURN  255
GDSUB 2470  ZONG CALL HCHAR (RD+2, CL-1, 147)  ZONG CALL HCHAR (RD+2, CL-1, 148, L1)  ZONG CALL HCHAR (RD+2, CL-1, 148, L1)  ZONG CALL HCHAR (RD+2, CL-1, 149)  ZONG CALL KEY (0, K, S)  ZONG REM RESERVED TO CLOSE FILES  ZONG REM ***END***END***END***END**  ZONG REM ***END***END***END***END**  ZONG REM ***END***END***END**  ZONG REM ***END***END***END**  ZONG REM ***END***END***END**  ZONG REM ***END***END***END**  ZONG REM ***END***END**  ZONG REM ***END***END**  ZONG REM ***END***END**  ZONG REM ****END***END**  ZONG REM *******  ZONG REM *******  ZONG (LABEL*, P, 1)))  ZONG REM *****  ZONG (LABEL*, P, 1)))  ZONG REM *****  SUBROUTINE FOR BAR STEMS ***
CALL HCHAR (RD+2, CL-1, 147)  CALL HCHAR (RD+2, CL-1, 148, L1)  CALL HCHAR (RD+2, CL-1, 148, L1)  CALL KEY (0, K, S)  IF S=0 THEN 2370  CHR RESERVED TO CLOSE FILES  CHR RESERVED TO CLOSE FILES  CHR FOR *** SUBROUTINE FOR  VERTICAL LABELS **  FOR P=1 TO LEN (LABELS)  CALL HCHAR (ROM+P-1, CLMN, ASC (SE G\$ (LABEL\$, P, 1)))  CALL HCHAR (ROM+P-1, CLMN, ASC (SE G\$ (LABEL\$, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE G\$ (LABEL\$, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE G\$ (LABEL\$, P, 1)))  CASS FOR P=1 TO LEN (LABEL\$)  CALL HCHAR (ROM, CLMN-1+P, ASC (SE G\$ (LABEL\$, P, 1)))  CASS FOR P=1 TO LEN (LABEL\$)  CALL HCHAR (ROM, CLMN-1+P, ASC (SE G\$ (LABEL\$, P, 1)))  CASS FOR P=1 TO LEN (LABEL\$)  CALL HCHAR (ROM, CLMN-1+P, ASC (SE G\$ (LABEL\$, P, 1)))  CASS FOR P=1 TO LEN (LABEL\$)  CALL HCHAR (ROM, CLMN-1+P, ASC (SE G\$ (LABEL\$, P, 1)))  CASS FOR P=1 TO LEN (LABEL\$)
CALL HCHAR (RD+2, CL, 148, L1)  CALL HCHAR (RD+2, CL, 1, 149)  CALL KEY (0, K, S)  IF S=0 THEN 2370  CHART RESERVED TO CLOSE FILES  POR REM ***END***END***END***END**  POR P=1 TO LEN (LABELS)  CALL HCHAR (ROM+P-1, CLMN, ASC (SE GS (LABELS, P, 1)))  CHART P  CALL HCHAR (ROM+P-1, CLMN, ASC (SE GS (LABELS, P, 1)))  CHART P  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))  CALL HCHAR (ROM, CLMN-1+P, ASC (SE GS (LABELS, P, 1)))
CALL HCHAR (RD+2, CL+L1, 149)  2374 CALL KEY (0, K, S)  15 S=0 THEN 2370  2376 REM RESERVED TO CLOSE FILES  END  END  END  REM ***END***END***END***END**  REM *- SUBROUTINE FOR  VERTICAL LABELS -*  POR P=1 TO LEN(LABEL\$)  CALL HCHAR (ROM+P-1, CLMN, ASC (SE  G\$ (LABEL\$, P, 1)))  2436 RETURN  REM *- SUBROUTINE FOR  HORIZONTAL LABELS -*  2436 FOR P=1 TO LEN(LABEL\$)  2436 FOR P=1 TO LEN(LABEL\$)  AND CALL HCHAR (ROW, CLMN-1+P, ASC (SE  STEMS *  STEMS RETURN  REM *- SUBROUTINE FOR BAR  STEMS RETURN  REM *- SUBROUTINE FOR BAR  STEMS *  STEMS *  SUBROUTINE FOR BAR
IF S=0 THEN 2370  REM RESERVED TO CLOSE FILES  END  REM ***END***END***END***END**  REM **- SUBROUTINE FOR  VERTICAL LABELS *  VERTICAL LABELS *  CALL HCHAR (ROW+P-1, CLMN, ASC (SE  G\$ (LABEL\$, P, 1)))  *********************************
PARTICAL LABELS - *  CALL HCHAR (ROW+P-1, CLMN, ASC (SE G* (LABEL*, P, 1)))  PARTICAL LABELS - *  PARTICAL LABELS - *  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL LABELS - *  PARTICAL LABELS - *  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL REM * SUBROUTINE FOR BAR  STEMS *
PARTICAL LABELS - *  CALL HCHAR (ROW+P-1, CLMN, ASC (SE G* (LABEL*, P, 1)))  PARTICAL LABELS - *  PARTICAL LABELS - *  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL LABELS - *  PARTICAL LABELS - *  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL REM * - SUBROUTINE FOR BAR STEMS - *
PARTICAL LABELS - *  CALL HCHAR (ROW+P-1, CLMN, ASC (SE G* (LABEL*, P, 1)))  PARTICAL LABELS - *  PARTICAL LABELS - *  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL LABELS - *  PARTICAL LABELS - *  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  PARTICAL REM * - SUBROUTINE FOR BAR STEMS - *
VERTICAL LABELS -* VERTICAL LABELS -* VERTICAL LABELS -*  CALL HCHAR (ROW+P-1, CLMN, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW-P-1, CLMN, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW-P-1)  CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))  CALL HCHAR (ROW, CLMN-1+P, ASC (SE G* (LABEL*, P, 1)))
VERTICAL LABELS - *  POR P=1 TO LEN(LABELS)  CALL HCHAR(ROW+P-1, CLMN, ASC(SE  G\$(LABEL\$,P,1)))  CHART P  RETURN  REM *- SUBROUTINE FOR  HORIZONTAL LABELS -*  2486 FOR P=1 TO LEN(LABELS)  CALL HCHAR(ROW, CLMN-1+P, ASC(SE  G\$(LABEL\$,P,1)))  CHART P  RETURN  STEMS
CALL HCHAR (ROW+P-1, CLMN, ASC (SE G\$ (LABEL\$, P, 1)))  THE RETURN  THE REM *- SUBROUTINE FOR HORIZONTAL LABELS *  2*86 FOR P=1 TO LEN (LABEL\$)  ZARO CALL HCHAR (ROW, CLMN-1+P, ASC (SE G\$ (LABEL\$, P, 1)))  ZARO RETURN  REM *
G\$ (LABEL\$,P,1))  2430 NEXT P  2430 RETURN  2430 REM *- SUBROUTINE FOR  HORIZONTAL LABELS -*  2430 FOR P=1 TO LEN (LABEL\$)  2430 CALL HCHAR (ROW, CLMN-1+P, ABC (SE  56 (LABEL\$,P,1)))  2500 NEXT P  2500 RETURN  REM *
RETURN  REM *- SUBROUTINE FOR  HORIZONTAL LABELS -*  2000 FOR P=1 TO LEN(LABELS)  CALL HCHAR (ROW, CLMN-1+P, ASC (SE  GO (LABELS, P, 1)))  COMO NEXT P  RETURN  REM *
RETURN  REM *- SUBROUTINE FOR  HORIZONTAL LABELS -*  2486 FOR P=1 TO LEN(LABELS)  ZABE CALL HCHAR (ROW, CLMN-1+P, ASC (SE  G* (LABEL*, P, 1')))  ZABE RETURN  RETURN  REM *
HORIZONTAL LABELS -*  LABELS
HORIZONTAL LABELS -*  2*80 FOR P=1 TO LEN(LABEL*)  2*80 CALL HCHAR (ROW, CLMN-1+P, ASC (SE  6* (LABEL*, P, 1)))  2*80 NEXT P  2*80 RETURN  STEMS*
CALL HCHAR (ROW, CLMN-1+P, ASC (SE GE (LABELS, P. 1)))  COM NEXT P  COM RETURN  REM * SUBROUTINE FOR BAR  STEMS*
GE (LABELS, P. 1)))  COMPONENT P  COMPONENT
RETURN REM * SUBROUTINE FOR BAR STEMS*
STEMS SUBROUTINE FOR BAR
STEMS SUBROUTINE FOR BAR
BERRO CALL VCHAR (22-YY), CLMN-1, 104+BA
R#8, YY-1)
CALL VERNEY CAZETT SELECTION DESCRIPTION
2556 CALL VCHAR (22-YY, CLMN+1, 106+BA
R*8, YY-1)
SHAM RETURN
무색류이

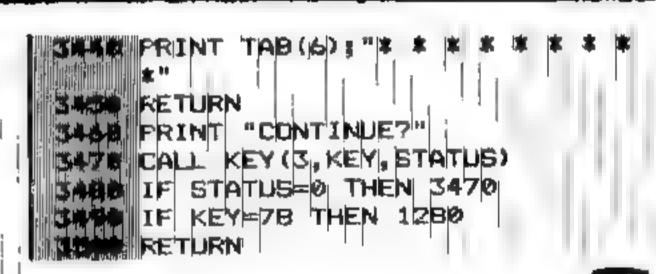
### Purl Two . . . from p. 95

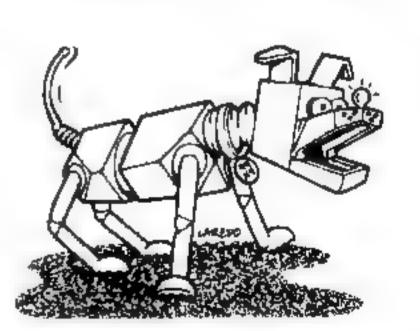
FFFFFC0")

```
PRINT "TIMES"
RETURN
PRINT "INSERT FASHION DRAPE ON
PRINT "ROW" : DR
GDSUB 3430
型用車機 GOSUB 1570
2820 GOSUB 3460
2900 S$="
             PLEASE NOTE!"
GOSUB 3370
THE PRINT
FRINT "S/R INSTRUCTIONS USE BO
    TH!"
PRINT
MEN WORKING FASH
    ION"
PRINT
PRINT "DRAPE.
WHIM PRINT "INSTRUCTIONS FOR HIP SH
    DULD"
PRINT
 PRINT "BE APPLIED TO EACH SIDE
     ON"
PRINT
    PRINT "ALTERNATING ROWS."
GOSUB 3430
    GOSUB 1590
    GOSUB 3460
          SHAPING FASHION DRAPE"
    9$="
50SUB 3370
50SUB 2570
RETURN
           INPUT MEASUREMENTS
    5$=="
GOSUB 3370
PRINT
```

```
3100 PRINT
3110 INPUT "MACHINE USED? ":M#
3124 FRINT
INPUT "ROW GAUGE? "#RG
3148 PRINT
MINDUT "STITCH GAUGE? " SG
3160 FRINT
INPUT "WAIST H EASE? ": WA
3180 PRINT
3198 INPUT "HIP + EASE? ":HP
3200 PRINT
3210 INPUT "FLARE? ":FL
3220 PRINT
3230 INPUT "LENGTH? ":LN
3240 PRINT
3250 INPUT "HIP LOCATION? ":HL
3240 PRINT
SEPP INPUT "DEPTH OF HEM? ":HM
3200 PRINT
324 INPUT "DEPTH OF BAND? ": BA
3300 PRINT
1 INPUT "NO OF PANELS DESIRED? "
3320 IF FL<1 THEN 3350
3330 IF PAK2 THEN 3350
STAR IF WAYHP THEN 3350 ELSE 3360
3350 GOTO 1410
3340 RETURN
3370 CALL CLEAR
3386 PRINT TABILE);
3370 PRINT
3444 PRINT 54
3416 PRINT
RETURN
SATA PRINT
```

透明的 INPUT "YARN USED? ":"U等





June's Choice

Our readers have spoken. The winner of the June B.A.R.C. Back competition is Samuel Pincus for his article, Drive for Diskettes, Part 2. Our hearty congratulations and a \$100 prize go to Mr. Pincus.

INPUT TENSION? ":T

2130 L1=L2

3000 PRINT

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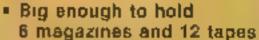
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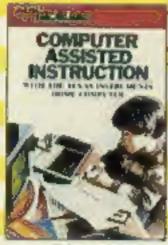
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